

**MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY**

FTA GRANT NO. AND TITLE *TBD*

CONTRACT SPECIFICATIONS

for

MBTA Contract No. R20CN01

WORK PLATFORMS FOR RIVERSIDE

CARHOUSE

Newton, MA

CONFORMED SET

NOVEMBER 2015

Baker | Wohl
ARCHITECTS

**132 LICOLN STREET #4
BOSTON, MA 02111**

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION

Stephanie Pollack

Secretary and Chief Executive Officer

BOARD OF DIRECTORS

Ruth Bonsignore (Chair)

Robert Moylan, Jr.

Dominic Blue

Brian Lang

Steve Poftak

Betsy Taylor

INTERIM GENERAL MANAGER OF THE MBTA &

RAIL & TRANSIT ADMINISTRATOR OF MassDOT

Frank DePaola

ASSISTANT GENERAL MANAGER FOR DESIGN AND CONSTRUCTION

Edmond F. Hunter

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TO: ALL PROSPECTIVE BIDDERS

FROM: CONTRACT ADMINISTRATION DEPARTMENT
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

NOTE WELL:

PLEASE BE ADVISED THAT AN INFORMATIONAL BID FORM IS INCLUDED IN THE FRONT SECTION OF THE CONTRACT SPECIFICATIONS AND MUST NOT BE USED FOR BIDDING PURPOSES. BIDDERS MUST SUBMIT ALL BIDS ELECTRONICALLY USING EXPEDITE SOFTWARE AVAILABLE AT WWW.BIDX.COM.

Prior to submitting an electronic bid over the Internet, each bidder must have a Digital Identification (ID) issued by the Authority, on file with Info Tech, Inc., and enabled by Info Tech, Inc. Using this Digital ID shall constitute the Bidder's signature for proper execution of the Proposal

ALL BIDS MUST BE SUBMITTED ELECTRONICALLY AT WWW.BIDX.COM

Interested parties can subscribe to the BidExpress on-line bidding exchange by following the instructions provided at www.bidx.com or by contacting:

Info Tech Inc.
5700 SW 34th Street, Suite 1235
Gainesville, FL 32608-5371
email: customer.support@bidx.com

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MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
100 SUMMER ST., SUITE 1200
BOSTON, MA 02110
NOTICE TO BIDDERS

Electronic proposals for the following project will be received through the internet using Bid Express until the date and time stated below, and will be posted on www.bidx.com forthwith after the bid submission deadline. No paper copies of bids will be accepted. Bidders must have a valid digital ID issued by the Authority in order to bid on projects. Bidders need to apply for a digital ID with Bid Express at least 14 days prior to a scheduled bid opening date.

Electronic bids for MBTA Contract No. R20CN01, **WORK PLATFORMS FOR RIVERSIDE CARHOUSE, Newton, Massachusetts (CLASS 1, GENERAL TRANSIT CONSTRUCTION AND PROJECT VALUE - \$2,730,630.00)**, can be submitted at www.bidx.com until two o'clock (2:00 p.m.) on **September 3, 2015**. Immediately thereafter, in a designated room, the Bids will be opened and read publicly.

Work consists of: Four work platforms (with associated structural supports, fire protection, lighting, power, and compressed air), toilet room renovations, HPCU room ventilation, and various other associated items of work.

This Contract is subject to a financial assistance Contract between the MBTA and the Federal Transit Administration of U.S. Department of Transportation. FTA Participation 20 percent.

Each prospective bidder proposing to bid on this project must be prequalified in accordance with the Authority's "Procedures Governing Classification and Rating of Prospective Bidders." Copies may be obtained at www.mbtta.com. Requests for prequalification for this Project will not be accepted by the Authority after the tenth (10th) day preceding the date set for the opening of bids.

Prequalified bidders may obtain from the Contract Administration Office a "Request for Bid Form" which must be properly filled out and submitted for approval.

Bidding documents may be downloaded from the MBTA FTP site, or delivered on CD via Fed Ex. Documents will be available starting at 9:00 AM on **July 20, 2015**. Contract Specifications and Drawings shall be available in portable data file (.pdf) format. Interested parties may request FTP site credentials or Fed Ex delivery of the project documents on CD by completing the request form on the project page at:
http://www.mbtta.com/business_center/bidding_solicitations/current_solicitations/

Bidders' attention is directed to Appendix 1, Notice of Requirement for Affirmative Action to Insure Equal Employment Opportunity; and to Appendix 2, Supplemental Equal Employment Opportunity, Anti-Discrimination, and Affirmative Action Program in the specifications. In addition, pursuant to the requirements of Appendix 3, Disadvantaged Business Enterprise (DBE) Participation Provision, Bidders must submit an assurance with their Bids that they will make sufficient and reasonable efforts to meet the stated DBE goal of 10 percent.

Bidders will affirmatively ensure that in regard to any contract entered into pursuant to this solicitation, minority and female construction contractors will be afforded full opportunity to submit Bids and will not be discriminated against on the grounds of race, color, religion, sex, age, or national origin in consideration for an award.

Bidders will be required to comply with Federal Equal Employment Opportunity Regulations and the President's Executive Order No. 11246 and any amendments or supplements thereto. Bidders will also be required to comply with the Governor's Executive Order No. 481, prohibiting the use of undocumented workers on State Contracts and any amendments and supplements thereto.

Authorization for the Bidders to view the site of the work on the MBTA's property shall be obtained from the Project Manager, **Roma McKenzie-Campbell, Design and Construction Directorate, 100 Summer Street, 12th Floor, Boston, MA 02110; 617 222-4428.** The Authority will conduct an inspection tour of the site on **August 6, 2015.** Bidders are requested to be present in front of the **Engineering Office Building adjacent to the north corner of the Riverside Carhouse at 325 Grove Street, Newton, Massachusetts,** at **9:00 a.m.** to participate in the tour. After the visit of the Riverside Carhouse, a visit will be made to the Reservoir Carhouse at 400 Chestnut Hill Avenue in Brookline, MA, to inspect the existing work platform there (which is the basis of design for work platforms of this project). Bidders are advised that they should have representation at this tour as no extra visits are planned. **MBTA-approved Personal Protection Equipment (PPE) and evidence of current MBTA Right Of Way (ROW) Training are required to participate in the tour.**

A prebid conference will be held on **August 17, 2015 at 10:00 a.m.** at the **Design and Construction Directorate, 100 Summer Street, 12th Floor, Boston, MA.** Any request for interpretation of the Plans and Specifications should be submitted in writing at the same time.

Bidders will be required to certify as part of their bids that they are able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.

This Contract is subject to Federal wage and hourly laws and minimum State wage rates as well as all other applicable labor laws.

Bidders are advised that the "Buy America" provisions of the Surface Transportation Assistance Act of 1982 (Pub. L-97-424) as amended, apply to any Contract, procurement or agreement which results from this solicitation.

Bid Guaranty shall consist of a bid deposit in the amount of five (5) percent of the value of the bid, in the form of a bid bond, cash, certified check, treasurer's or cashier's check.

The successful Bidder shall be required to furnish a Performance Bond and a Labor and Materials Payment Bond each for the full amount of the Contract price.

The Authority reserves the right to reject any or all Bids, to waive informalities, to advertise for new Bids or proceed to do the work otherwise, as may be deemed to be in the best interests of the Authority.

This information may be viewed at the MBTA website:

http://www.mbtacom/business_center/bidding_solicitations/current_solicitations/

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

Date: **July 20, 2015**

By: **Stephanie Pollack**
Secretary and Chief
Executive Officer of
MassDOT

Frank DePaola
Interim General Manager of the MBTA

SECTION 00200

INSTRUCTIONS TO BIDDERS – FTA

1.1 BID FORMS AND DRAWINGS

A. Prequalification Prior to Requesting Bid Forms.

1. Prospective Bidders proposing to bid on any work to be awarded by the Authority shall be pre-qualified and certified in accordance with the Authority's "Procedures Governing Classification and Rating of Prospective Bidders", if the value of work to be bid added to the value of the Prospective Bidder's uncompleted work already under contract with the Authority will aggregate \$1,000,000 or more. (Also see Article 1.12 of this Section.)
2. For work aggregating under \$1,000,000, pre-qualification and certification is desirable, but not required.

B. Issuance of Bid Forms and Drawings.

1. Prequalified Bidders shall obtain from the Contract Administrator a "Request for Bid Forms" and submit same properly filled out to the Contract Administrator for approval. Authority will consider each "Request for Bid Forms" and determine whether or not the prospective Bidder will be permitted to submit an electronic bid using BidXpress Software.
2. The Notice to Bidders, Instructions to bidders, and Bid Form, specifying limits, location and description of the contemplated work, time within which the work must be completed, certain special requirements for the particular Contract, and estimates of the various quantities of the Work to be performed and materials to be furnished will be provided to permitted bidders. Permission to bid will also entitle the prospective Bidder to a set of Contract Drawings, Contract Specifications, and other Contract Documents relating to the contemplated work.
3. Copies of the aforementioned documents, for informational purposes only, are made available to interested parties as described in the Notice to Bidders for each construction project.

1.2 INTERPRETATION OF BIDS

- ##### A.
- Bids will be compared on the lump sum amount submitted for performing the Work, as shown in the Bid form.

1.3 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK

- ##### A.
- Before submitting a Bid, each prospective Bidder shall (1) examine Contract Documents thoroughly; (2) visit the site to be familiar with observable conditions that may in any manner affect cost, progress, or performance of the Work; (3) be familiar with Federal, State, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the Work and; (4) study and correlate information thus determined with the Contract Documents.
- ##### B.
- By submitting a bid the Bidder represents that every requirement of this Article and the following Article 1.04 has been complied with and that the Contract Documents are sufficient in scope and

detail to indicate and convey understanding of all terms and conditions for performance of the Work.

- C. Complete information and authorization for the Bidders to view the site of the work on Massachusetts Bay Transportation Authority's property shall be obtained from the office of **Ms. Roma McKenzie-Campbell, Project Manager, 100 Summer Street, 12th Floor, Boston, MA 02110, Telephone No. (617) 222-4428.**
- D. The Authority will conduct an inspection tour of the site on **Month/Day/2015**. Bidders are requested to be present in front of the **Engineering Office Building adjacent to the north corner of the Riverside Carhouse at 325 Grove Street, Newton, Massachusetts, at 10:00 a.m.** to participate in the tour. Bidders are advised that they should have representation at this tour as no extra visits are planned. **MBTA-approved Persona Protection Equipment (PPE) and evidence of current MBTA Right Of Way (ROW) Training are required to participate in the tour.**
- E. In addition to visiting the site for the purposes as specified above the Bidders shall visit the site to ascertain pertinent local conditions readily determined by inspection and inquiry, such as the location, accessibility, traffic conditions and general character of the site, labor conditions, the character and extent of existing work within or adjacent thereto, and any other work being performed.
- F. The Authority does not guarantee or represent that existing construction or conditions conform to the Drawings. The Bidder shall visit the site and satisfy himself as to existing conditions. All necessary information shall be verified in the field before fabrication of new material. No claim for extra cost will be allowed by the Authority because of the Contractor's unfamiliarity with site conditions.

1.4 NOT USED

1.5 PREPARATION OF BIDS

A. Bid Prices.

1. Bidder shall submit the Bid electronically after using Expedite Software to prepare the bid submission package. Bids are to be submitted at: <https://www.bidx.com>.
2. Price for any item, bid and contracted for, unless otherwise noted or specified, shall include full compensation for all materials, equipment, tools, labor, and incidental work necessary to complete the item to the satisfaction of Authority. Prices, without exception, shall be net, not subject to discount, and shall include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the Work.
3. The Schedule of Bid Prices included in the electronic bid submission will be used for the indicating of the Bid price information specified above.
4. In the event that there is an error in the computed totals based upon the unit prices and estimated quantities, the unit prices shall govern.

B. Addenda.

1. Prospective Bidder shall acknowledge receipt of Addenda by noting the numbers of those received on the appropriate form contained in the electronic bid package.

C. Signatures.

1. Bid shall be submitted using secure electronic signature provisions built into the bid submission function of the InfoTech Inc.'s Expedite software.
 - a. If Bid is made by an individual, that person's name and post office address shall be stated.
 - b. If Bid is made by a firm, partnership, or corporation, it shall be signed by a person having such legal authority from said firm, partnership or corporation and the person so signing Bid shall give his own name and title (if any) in addition to the name and address of the firm, partnership, or corporation. If Bid is made by a firm or partnership, names and addresses of the individual members shall be given.
 - c. If Bid is made by a corporation, the name of the State under the laws of which the corporation was chartered and names and titles of the President, Treasurer, and Secretary or Clerk of the corporation shall be given.
 - d. If Bid is made by two or more individuals, a joint venture must be formed for the purpose of submitting such a bid. The joint venture company must be prequalified as described previously in section 1.1.A.1

D. Affidavits.

1. Bidder shall certify on the affidavit form included with Bid that:
2. To the best of the Bidder's knowledge, said Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such Contract.
3. Bids must contain the properly completed affidavit of non-collusion folder contained in the electronic bid submission package

1.6 DELIVERY OF BIDS

A. Prior to the time set for openings of Bids, Bidder shall submit Bid as follows:

1. All bids must be submitted using InfoTech Inc.'s Expedite software at www.bidx.com
2. A Bid may also be modified or withdrawn by a Bidder or the Bidder's authorized representative, using the capabilities to modify or withdraw bids at www.bidx.com, but only if the withdrawal is made prior to the exact time set for opening of Bids. (Also see Section 00200, Article 1.8).
3. The only acceptable evidence to establish the time of bid submission is the receipt generated by the bid submission function of the Expedite software at www.bidx.com.
4. Bidders are advised that the Bid Form must include a Bid price for each of the items listed on the Contract Schedule of Bid Prices. The omission of a Bid price for any of the items is cause for rejection of all Bid prices of the Bid.

1.7 BID GUARANTY REQUIRED

- A. In order to insure the faithful fulfillment of its term, each Bid shall be accompanied by a Bid Guaranty. Bid Guaranty shall be in the amount as specified in the "Notice to Bidders" in the form of an acceptable bid bond, cash, certified check, treasurer's or cashier's check issued to the MBTA by a responsible bank or trust company or by a surety or insurance company licensed or authorized by the Massachusetts Division of Insurance to engage in the business of surety in the Commonwealth and satisfactory to the Authority. Bid Guaranty shall be enclosed in a sealed envelope and be submitted with the Bid Form.

1.8 WITHDRAWAL OF BIDS

- A. Bidder may withdraw the Bid provided the request in writing is in the hands of Authority by the time set for opening Bids.
 - 1. When any such Bid is reached during the opening of the Bids, it will remain unread.

1.9 PUBLIC OPENING OF BIDS

- A. Bids will be publicly opened and the total price of each bid read at the time and place indicated in the "Notice to Bidders." Any person may at reasonable times and in the presence of a duly authorized representative of Authority examine any or all Bids after they have been opened and read.

1.10 REJECTION OF BIDS

- A. Bids which fail to meet the requirements of Articles 1.5, 1.6, and 1.7 of this Section or which are incomplete, conditional or obscure, or which contain additions not called for, erasures, alterations or irregularities of any kind or in which errors occur, or which contain abnormally high or abnormally low prices for any class or item of work, may be rejected as informal.
 - 1. On Federally Assisted (Financed) Projects, Bids will be rejected from any Bidder whose name appears on the U.S. Comptroller General's list of ineligible contractors for federally financed and assisted construction.
 - 2. Bidders are advised that the certificate pertaining to Ineligible Contractors on the electronic Bid Form must be completed in its entirety. Failure to fully complete and submit the required certification will be considered an informality and may render the Bid non-responsive.
- B. More than one Bid from the same Bidder, whether or not the same or different names appear on the signature page, will not be considered. Reasonable proof for believing that a Bidder is interested in more than one Bid for the Work contemplated will cause the rejection of all Bids made by the Bidder directly or indirectly. Any or all Bids will be rejected if there is reason for believing that collusion exists among Bidders. (See Article 1.14 of this Section.)

1.11 DISQUALIFICATION OF BIDDERS

- A. Bidders whose Bids have been rejected because of evidence of collusion, as specified in Article 1.10 of this Section shall not be considered in future Bids for the same work and such Bidders may be disqualified from bidding on future work.

1.12 COMPETENCY OF BIDDERS

- A. No contract will be awarded except to a responsible Bidder who has been prequalified and certified in accordance with the Authority's "Procedures Governing Classifications and Rating of Prospective Bidders" and adjudged capable of performing the class of work contemplated, when bid amount added to the value of Bidder's uncompleted work already under contract with Authority would aggregate \$1,000,000 or more.
- B. When Bidder prequalification is not required, low Bidder or lowest responsible Bidder (if requested by Authority) shall submit within five business days after the opening of bids, a post-qualification statement, duly signed and sworn to, outlining Bidder's experience, equipment and financial resources, on forms prescribed or furnished by Authority. A Bidder who fails to comply with this requirement will not be considered for Award of the Contract.

1.13 MATERIAL GUARANTY

- A. Bidder may be required to furnish without expense to the Authority a complete statement of the origin, composition, and manufacture of any or all materials proposed to be used in the construction of the work, together with samples, which may be subjected to the test required by Authority to determine the quality and fitness of the material.

1.14 CONSIDERATION OF BIDS

- A. Authority reserves the right to reject any or all Bids, to waive technicalities, to advertise for new Bids, or proceed to do the Work as may be deemed to be in the best interests of the Authority.

1.15 AWARD OF CONTRACT

- A. Contract will be awarded by Authority subject to the reservations of Article 1.14, within 30 days after the opening of Bids, to the lowest responsible and eligible Bidder. However, for Contracts requiring concurrence by other State or Federal agencies, the Contract will be awarded 45 days from the opening of Bids. The successful Bidder will be notified in writing by mail or otherwise that Bid has been accepted and that Contract has been awarded.
- B. Basis of Award. The Contract will be awarded by the Authority subject to the reservations of Section 00200 Article 1.14 as specified above, within 60 calendar days after opening of Bids to the lowest responsible and eligible Bidder whose Total Estimated Contract Bid Price, based upon the proposed lump sum, is the lowest Bid received.

1.16 CANCELLATION OF AWARD

- A. Authority reserves the right to cancel the award of any contract at any time before the execution of the said contract by all parties without any liability against the Authority.

1.17 RETURN OF BID GUARANTY

- A. Bid Guaranty in the form specified in Article 1.07, except those of two lowest bidders will be returned within five days following opening of Bid.
- B. Bid Guarantees of lowest bidder and second lowest bidder will be retained until execution of the contract, previous to which, however, either Bidder who submitted cash, certified check, treasurer's or cashier's check as Bid Guaranty, may substitute a bid bond in an acceptable form furnished by a surety or insurance company licensed or authorized by the Massachusetts

Division of Insurance to engage to the business of surety in the Commonwealth and satisfactory to the Authority.

- C. After 60 days from the opening of Bids (as specified in Article 1.15), low Bidder may withdraw the Bid and request return of the Bid Guaranty, in which case Bid Guaranty of lowest Bidder and second lowest Bidder will be returned and second lowest Bidder's Bid shall not be considered or award. After 60 days from the opening of Bids (as specified in Article 1.15), second lowest Bidder may withdraw the Bid and request return of the Bid Guaranty, in which case only Bid Guaranty of second lowest Bidder will be returned.

1.18 CONTRACT BONDS REQUIRED

- A. Performance Bond in the full amount of the Contract will be required by Authority to ensure faithful performance of the Contract.
- B. Labor and Materials Payment Bond in the full amount of the Contract will be required to be furnished by the Contractor to Authority as security for payment by the Contractor and subcontractors for labor, materials, and rental of equipment. Said security shall remain in force until the validity of all claims shall be determined and if valid, paid by the surety.
- C. Name of the agency or agent writing these bonds shall be identified with or on the bond.
 - 1. Surety may be a bond in an acceptable form furnished by a surety or insurance company licensed or authorized by the Massachusetts Division of Insurance to engage in the business of surety in the Commonwealth and satisfactory to the Authority.
 - 2. All Alterations, extensions of time, extra work and any other changes authorized under these specifications, or under any part of the Contract may be made without obtaining the consent of the surety or sureties on the Contract Bonds.

1.19 EXECUTION OF CONTRACT

- A. Successful Bidder shall execute and deliver the Contract and furnish the required surety and certificate of insurance to Authority within 10 days after the date of the Notice of Award.
- B. Contract shall be in writing and shall be executed in the number of copies required by the Authority. One fully executed copy will be delivered to the Contractor.

1.20 FAILURE TO EXECUTE CONTRACT

- A. Should successful Bidder fail to execute the Contract and furnish the surety and certificate of insurance within the time stipulated, Authority may, at its option, determine that Bidder has abandoned the Contract and thereupon Bid and acceptance shall be null and void. Guaranty accompanying Bid shall be retained and collected by Authority. It is agreed that this Article shall be construed and treated by the parties to the Contract not as imposing a penalty upon said Contractor for failing to fully execute The Contract as agreed on or before the time specified in Bid, but as liquidated damages to compensate Authority for additional costs incurred by Authority because of the failure of the Contractor to fully execute the Contract on or before the date specified in Bid.

1.21 INTERPRETATIONS OF BID DOCUMENTS

- A. All questions about the meaning and intent of Bid Documents shall be submitted in writing, to

the Assistant General Manager for Design and Construction of the Massachusetts Bay Transportation Authority, at the address specified in the Notice to Bidders. To be given consideration, all questions must be received at least 10 days prior to the date fixed for the opening of Bids. An interpretation of all questions which Authority elects to give will be issued by written Addenda. Only questions answered by formal written Addenda will be binding. Oral communications or interpretations will be without binding legal effect. Addenda will be mailed, by certified mail with return receipt requested, to all who obtained Bid Documents. All Addenda so issued shall become part of the Bid Documents. Obvious discrepancies in Bid Documents which are not addressed by a Bidder in accordance with the above procedure will be construed against the successful Bidder should a dispute arise.

- B. A separate copy of the questions referring to meaning and intent of the Bid Documents shall be mailed to the Project Manager, at the address specified in the Notice to Bidders, and to be given consideration must be received at least 10 days prior to the date fixed for the openings of Bids. All interpretations the Authority elects to give will be made in the form of written Addenda to the Contract Documents, which Addenda shall become a part of the Bid Documents. The Addenda will be mailed to all persons who obtained Bid Documents in the manner described in the Notice to Bidders.

1.22 MASSACHUSETTS SALES AND USE TAX LAW OF 1967

- A. Attention of Bidders is directed to the Massachusetts Sales Tax, Chapter 64H, Section 6, and the Massachusetts Use Tax, Chapter 64I, Section 7, which state that these taxes are not applicable to the sales of construction materials and supplies incorporated, consumed, employed or expended in Construction Contracts of this Authority. This exemption is also applicable to rental charges for construction vehicles, equipment and machinery rented, specifically for use on the site of the Authority's construction projects. Bidders are directed to exclude any allowance for Sales or Use Tax from their Bids as said tax would relate to the foregoing specific categories.

1.23 NOT USED

1.24 DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION PROVISION

- A. Attention of all Bidders is directed to the assurance to be submitted with their Bids that they will make sufficient reasonable efforts to meet the stated DBE goal for this Contract. This assurance is provided on the EEO Certification and DBE Assurance folder of the electronic Bid Package..
- B. In addition, the attention of Bidders is directed to the requirements of the Disadvantaged Business Enterprise List folder of the electronic Bid Package included as Appendix 3 of the Supplementary conditions. The Disadvantaged Business Enterprise Participation Letter of Intent form, the Disadvantaged Business Enterprise Affidavit form, and the Disadvantaged Business Enterprise Unavailable Certification form may be reproduced for additional copies. Failure to comply and submit the required documentation will render the Bid non-responsive.
- C. For the purpose of this Contract, Bidders are reminded that the MBTA will only accept DBE's that are certified by the Massachusetts Supplier Diversity Office (SDO) or a certified out-of-state firm certified under Section 8(a) of the Small Business Act. The two lowest Bidders must submit the DBE(s) most recent certification letter(s) within three business days of the bid opening.

1.25 BUY AMERICA

- A. This solicitation and the resulting contract are subject to the Buy America requirements of 49 U.S.C. §5323(j) and the Federal Transit Administration's implementing regulations found at 49 CFR Part 661. These regulations require, as a matter of responsiveness, that the bidder or offeror submit with its offer a completed certification in accordance with § 661.6 or § 661.12, as appropriate.
- B. A Buy America Certificate, contained in the electronic bid package, must be completed and submitted with the bid. A bid which does not include the completed certificate will be considered non-responsive.
- C. A waiver from the Buy America Provision may be sought by the Authority if grounds for the waiver exist.
- D. Section 165a of the Surface Transportation Assistance Act of 1982, as amended, permits FTA participation on this contract only if steel, iron and manufactured products used in the contract are produced in the United States.

1.26 FUEL AND ASPHALT PRICE ADJUSTMENT CLAUSE

- A. Should this Contract contain a fuel and asphalt price adjustment clause, the Supplementary Conditions of the Contract Specifications will provide information for baseline prices and application guidelines.

1.27 PREBID CONFERENCE

- A. A Pre-bid Conference will be held at **10 a.m. on August 17, 2015** at the office of the Project Manager, **Roma McKenzie-Campbell, Design and Construction Directorate, 100 Summer Street, 12th Floor, Boston, MA 02110; 617 222-4428**. It is imperative that prospective Bidders have a representative attend this meeting. Any request for interpretation of drawings and specifications should be submitted in writing at the same time.

1.28 NOT USED

1.29 EQUAL EMPLOYMENT OPPORTUNITY (EEO)

- A. Attention of all Bidders is directed to Section 00700, General Conditions, Article 5.26, and Paragraph DD of the Supplementary Conditions. Compliance with these Specifications requires completion in full of the certification contained in the electronic bid package. Failure to comply fully and submit the required Certification may render the Bid non-responsive.

1.30 BIDDER STATUS IDENTIFICATION

- A. Bidder's attention is directed to the applicable folder in the electronic bid package regarding status identification. Bidders are advised that the applicable section of the above must be completed in its entirety.

1.31 CERTIFICATION OF DUMPING FACILITIES

- A. Bidders are advised that the Certification of Dumping Facilities folder in the electronic bid package must be completed in its entirety.

1.32 RIGHT-TO-KNOW LAW

- A. Bidders are advised that the Right-to-Know Law Certification folder in the electronic bid package must be completed in its entirety.

1.33 APPEALS AND PROTEST PROCEDURES

- A. **Introduction** -The following procedures apply to all MBTA procurements, including those that originate from and are the responsibility of the Materials Management Department (Goods and Services Purchases) and the Design and Construction Department (Construction and Professional Services contracts). Interested parties (Interested Party means an actual or prospective bidder, proposer or offeror whose direct economic interest would be affected by the award of a contract or by the failure to award a contract) must follow the procedures specified for the particular procurement that is being appealed/protested. In the event that an interested party has an appeal/protest for a procurement/contract that involves an area of responsibility not identified herein, the appeal/protest must be sent to the MBTA's Chief of Staff, General Manager's Office, Ten Park Plaza, Boston, for review. A protest will be processed in the time frames and structure as specified below. In addition, the MBTA will disclose information regarding the protest to the Federal Transit Administration (FTA) in writing.

B. PRE-BID APPEALS – CONSTRUCTION AND PROFESSIONAL SERVICES

1. If it is the opinion of any interested party that the Specifications/Scope of Work or any other requirement of the proposed procurement are in any way ambiguous, incorrect, incomplete or restrictive, the interested party shall contact the Authority, in writing, via U.S. Mail and facsimile, at least ten (10) business days prior to the bid opening date or proposal submittal date. The letter should be addressed to the Director of Contract Administration of the MBTA at 100 Summer St., Boston, MA 02110. The letter should identify the procurement that is underway (Contract/RFP number and description) and the specific issue to be addressed. Any protest about the content of a specification is waived if not filed prior to the bid opening or proposal submittal date. The Director of Contract Administration will review the interested party's protest and will respond, in detail, to each substantive issue raised by the interested party within three (3) business days. If the matter requires further evaluation, the Director of Contract Administration will notify the protesting party in writing (by facsimile and U.S. Mail) of the extended review period. A final response will be issued by the Director of Contract Administration upon final review of the matter. One of the following steps will be taken prior to the bid opening date or proposal submittal date:
 - a. The Authority may elect to conduct an informal conference on the merits of a protest with interested parties;
 - b. If, upon review, the Authority determines that a change should be made to the specification and/or the bid documents, an addendum will be issued to all interested parties;
 - c. If the Authority determines that no change should be made to the specification and/or the bid documents, but that it is necessary to clarify any point made by the interested party, a Letter of Clarification will be issued to all interested parties; or
 - d. If the Authority determines that neither a change nor a clarification should be made to either the specification or the bid documents, then, the interested party should be notified in a timely fashion in writing (by facsimile and telephone, if possible) of the Authority's determination.
2. If the interested party does not believe that the response addressed his/her concerns, he/she may appeal this decision to the General Counsel, in writing, prior to the bid

opening date or the proposal submittal date. The matter will be reviewed and a response will be made in accordance with steps a. through d. above. The bids or proposals may be opened and the Authority may elect to proceed with an award during the pendency of a protest, if the Authority determines that:

- a. The items to be procured are urgently required; or
 - b. Delivery or performance will be unduly delayed by failure to make the award promptly; or
 - c. Failure to make prompt award will otherwise cause undue harm to the MBTA.
3. ONCE THE GENERAL COUNSEL'S DETERMINATION HAS BEEN MADE, THE AUTHORITY'S DECISION IS FINAL AND WILL NOT BE RECONSIDERED UNLESS THERE IS ADDITIONAL INFORMATION WHICH WAS NOT AVAILABLE TO THE APPEALING PARTY AT THE TIME THE APPEAL WAS MADE.

C. POST APPEALS – CONSTRUCTION & PROFESSIONAL SERVICES

1. Post -Bid appeals by an interested party shall be made in writing via U.S. Mail and facsimile within three (3) business days of the bid opening date or the notification date of a selected proposer and shall be made as follows:
 - a. The initial protest or appeal shall be made to the Director of Contract Administration of the MBTA at 100 Summer St., Suite 1200, Boston, MA 02110, who will collect the factual information pertaining to the appeal.
 - b. After discussion and appropriate -review, the Director Contract Administration will forward a recommendation to the Assistant General Manager for Design and Construction (AGM).
 - c. If the AGM does not concur with the recommendation-, the AGM will obtain any other additional information required so that a determination can be made, at which time the interested party will be notified in writing of the Authority's determination within five (5) business days. If the matter requires further evaluation, the AGM will notify the protesting party in writing (by facsimile and U.S. Mail) of the extended review period. A final response will be issued by the AGM upon final review of the matter.
 - d. If the interested party does not agree with the determination, he/she may appeal directly to the Authority's General Counsel in writing within three (3) business days of the AGM's determination.
 - e. The General Counsel will review all facts of the appeal and will make a final determination and will advise the interested party of his decision within five (5) business days. If the matter requires further evaluation, the General Counsel will notify the protesting party in writing (by facsimile and US Mail) of the extended review period. A final response will be issued by the General Counsel upon final review of the matter.
2. ONCE THE GENERAL COUNSEL'S DETERMINATION HAS BEEN MADE, THE AUTHORITY'S DECISION IS FINAL AND WILL NOT BE RECONSIDERED UNLESS THERE IS ADDITIONAL INFORMATION WHICH WAS NOT AVAILABLE TO THE APPEALING PARTY AT THE TIME THE APPEAL WAS MADE.

D. GENERAL INSTRUCTIONS/ INFORMATION

1. In the event that the subject contract procurement is federally funded, all prospective interested parties are notified of the following:
 - a. FTA's review of the protest will be limited to the MBTA's failure to have or follow its written protest procedures. The appeal to FTA must be received by

the cognizant FTA regional or Headquarters Office within five (5) working days of the date the protester knew or should have known of the violation. The protest/appeal is to be in accordance with FTA Circular 4220.1F (as periodically updated).

- b. Note: The interested party must exhaust all administrative remedies with the MBTA before electing to pursue a protest with the Federal Transit Administration (FTA).
2. In the event that a protest is pending:
 - a. The MBTA reserves the right to proceed with the procurement, which may include the opening of bids or proposals and the subsequent award of a contract, regardless of the existence of a protest that is pending, in the event that a determination has been made that:
 1. The supplies or services to be contracted for are urgently required;
 2. Delivery or performance will be unduly delayed by failure to make award promptly;
 3. Failure to make a prompt award will otherwise cause undue harm to the MBTA or the Federal Government.
3. If award is made, the procurement file will be documented to explain the basis of award. Written notice of the decision to proceed with the award will be sent to the protester and other interested parties.

1.34 Certification regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion

- A. The Bidder will meet the requirements of 49 CFR Part 29 related to Debarment, Suspension, Ineligibility and Voluntary Exclusion.
- B. In accordance with 49 CFR Part 29 and the "Instructions for Certification", the Bidder must complete the Certification regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion folder in the electronic bid package in its entirety. Bidders will provide either a "Primary Participant" certification, if the contract value is \$100,000.00 or more, or a "Lower Tier" certification, if the contract value exceeds \$25,000.00 and is less than \$100,000.00.
- C. Lower Tier Certification (including DBE Subcontractors) is **not required as part of the bid submittal** but may be submitted as soon as practicable but in all cases prior to subcontractor approval by the Authority in accordance with Article 6.01., Paragraph E of the Authority's Standard Specifications", General Conditions Section 00700.
- D. In the event a Bidder cannot provide a certification as set forth above, an explanation will be provided and attached to the certification.

1.35 Lobbying Restrictions

- A. Restrictions
 1. The Contractor shall timely comply with the requirements of the lobbying restrictions set forth in Section 301 of Public Law 101 - 121, as implemented by the Department of Transportation in 49 C.F.R. Part 20, and as those authorities may be hereafter amended.
 2. If a Standard Form - LLL, "Disclosure Form to Report Lobbying", is required to be completed by the Contractor or subcontractor at any tier, such disclosure shall be furnished to the Deputy Director of Construction - Contracts.
- B. Certification of Restrictions on Lobbying

1. The Bidder certifies on the Certification on Restrictions on Lobbying folder contained in the electronic bid package, to the best of his or her knowledge or belief that it and its Principals:
 - (a) No Federal appropriated funds have been paid, or will be paid, by or on behalf of the undersigned, to any person for the influencing or the attempting to influence an officer or employee of any agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering of any cooperative agreement and the extension, continuation, renewal, Amendment, or modification of any cooperative of any Federal contract, grant, loan or agreement.
 - (b) If any funds other than Federal appropriate funds have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.
 - (c) The undersigned shall require that the language of this certification be included in the award Documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made and entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31 U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 or not more than \$100,000 for each failure.

1.36 NOT USED

1.37 CERTIFICATION OF CONSTRUCTION EQUIPMENT STANDARD COMPLIANCE

- A. The contractor certifies that all diesel construction equipment used in this contract shall have emission control devices installed, such as oxidation catalysts or particulate filters on the exhaust system side of the diesel combustion engine equipment.
- B. Bidders are advised that the MBTA Construction Equipment Standard Compliance folder in the electronic bid package must be completed in its entirety.

1.38 CERTIFICATION OF UNDOCUMENTED WORKERS

- A. The contractor certifies that all workers and employees used in this contract are legally documented workers and that the Contractor has verified the immigration status of all workers assigned to the Contract.
- B. Bidders are advised that the MBTA Contractor Certification for Undocumented Workers folder in the electronic bid package must be completed in its entirety.

1.39 OSHA TRAINING CERTIFICATION

- A. Attention of all Bidders is directed to Section 00700, General Conditions, Article 5.15,

regarding worker safety training. Compliance with these Specifications requires completion in full of the Certification of Work in Harmony and OSHA Training contained in the electronic bid package. Failure to comply fully and submit the required Certification may render the Bid non-responsive.

1.40 CONTRACTOR CERTIFICATION MBTA RETIREE PARTICIPATION DISCLOSURE

- A. Bidders are advised that the MBTA Retiree Participation Disclosure folder in the electronic bid package must be completed in its entirety

END OF SECTION

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
TRANSPORTATION BUILDING
10 PARK PLAZA
BOSTON, MASSACHUSETTS 02116-3975

FORM FOR BID

TO THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

The undersigned hereby declares to have carefully examined the annexed form of Contract, Specifications and Plans therein referred to and also the sites upon which the Project Work is to be performed.

The undersigned proposes to furnish all labor, materials, and equipment required for Massachusetts Bay Transportation Authority Contract Contract No. R20CN01
Work Platform for Riverside Car house
for the Massachusetts Bay Transportation Authority in accordance with the Plans and Specifications prepared by
BAKER / WOHL ARCHITECTS INC. of,

for the unit price, lump sum and allowance prices specified in the Schedule of Bid Prices, subject to additions and deductions according to the terms of the Specifications.

Accompanying this Bid Form is a bid deposit in the amount of five (5) percent of the value of the bid which shall become the property of the Massachusetts Bay Transportation Authority if, in case this Bid shall be accepted by said Authority, the undersigned shall fail to comply with the applicable statutes or fail as required hereby to execute the Contract with, and furnish bonds and certificates to, said Authority, within the time provided.

The undersigned also hereby declares that he is the only person interested in this Bid; that it is made without any connection with any other persons making any Bid for the same Work; that no person Authority is directly or indirectly interested in this Bid, or in any contract which may be made under it, or in expected profits to arise there from; and it is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or to refrain from bidding or to influence the bid of any other person or corporation and that this Bid is made in good faith, without collusion or connection with any person bidding for the same work; and that this Bid is made with distinct reference and relation to the Plans and Specifications prepared for this case and herein mentioned. The undersigned declares that in regard to the conditions affecting the work to be done and the labor and materials needed, this Bid is based solely on his own investigation and research and not in reliance upon any plans, surveys, measurements, dimensions, calculations, estimates or representations of any employee, officer, or agent of the Authority.

If the Bidder is a foreign corporation it agrees, in case this Bid is accepted, to comply with the applicable provisions of Massachusetts General Laws, Chapter 181, before the time for execution of the Contract, as hereinafter provided, occurs.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
TRANSPORTATION BUILDING
10 PARK PLAZA
BOSTON, MASSACHUSETTS 02116-3975

FORM FOR BID

TO THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (cont'd)

The undersigned proposes and agrees that, if within sixty (60) calendar days after the opening of bids, notice that the Bid has been accepted by the Authority shall be mailed to him at the business address given below, he shall execute the Contract and furnish a Performance Bond and also a Labor and Materials Payment Bond for the full amount of the Contract price, within ten (10) calendar days after the date of the Notice of Award.

The undersigned agrees to commence work within fifteen (15) calendar days from the date of the mailing of the executed Contract to the Contractor (Section 00700 of these Specifications) unless otherwise ordered in writing by the Engineer; and he shall complete the entire Work, fully and acceptably, as stipulated in Section 00700 Article 6.2 of the Project Specification.

The undersigned covenants that he has not employed or retained any company or person (other than a full time bona fide employee working for the Contractor) to solicit or secure this Contract, and that he has not paid or agreed to pay any company or person (other than such an employee) any gift, fee, contribution, percentage, or brokerage fee contingent upon or resulting from the award of this Contract. The Contractor warrants, represents and agrees that during the time this Contract is in effect, neither it nor any affiliated company, as hereinafter defined, participates in or cooperates with an international boycott, as defined in Section 999 (b) (3) and (4) of the Internal Revenue Code of 1954, as amended, or engages in conduct declared to be unlawful by Section 2 of Chapter 151E, Massachusetts General Laws. If there shall be a breach in the warranty representation and agreement contained in this paragraph, then without limiting such other rights as it may have, the MBTA shall be entitled to rescind this Contract. As used herein, an affiliated company shall be any business entity of which at least 51 percent of the ownership interests are directly or indirectly owned by the Contractor or by a person or persons or business entity or entities directly or indirectly owning at least 51 percent of the ownership interests of the Contractor, or which directly or indirectly owns at least 51 percent of the ownership interest of the Contractor.

Yes[X] No[] I agree to all of the conditions and stipulations listed above.

ACKNOWLEDGEMENT OF ADDENDA

The undersigned acknowledges receipt of 5 addenda. (fill in #)

--

Bidder acknowledges and affirms that he/she has obtained and applied all addenda issued during the bidding period. Yes[X] No[]

Total Estimated Contract Bid Price: \$ 2,574,100.00

Dept of Transportation
Schedule of Bid Prices

Date: 07-21-15
Revised: 08-31-15

Contract ID: R20CN01 Project(s): R20CN01
Letting Date: 09-03-15 Call Order: 002

Bidder: 2518 - Northern Contracting Corp.

Line	Item	Approx.	Unit Price		Bid Amount	
No.	Description	Quantity				
		and Units	Dollars	Cts	Dollars	Cts
Section 0000 Base Items						
Alt Group A00						
0001	0130174 MAINTENANCE FACILITY	1.000 LS	2,466,600.00000		2,466,600.00	
0002	0130429 TRAFFIC OFFICERS SERVICES	1.000 AN	2,000.00000		2,000.00	
0003	0213202 RODENT CONTROL	1.000 AN	2,500.00000		2,500.00	
0004	1500201 PLUMBING - ALLOWANCE	1.000 AN	3,000.00000		3,000.00	
0005	6500000 RISK ALLOWANCE	1.000 RA	100,000.00000		100,000.00	
Section 0000 Total					2,574,100.00	
TOTAL ESTIMATED CONTRACT BASE BID PRICE					2,574,100.00	

ELIGIBLE CONTRACTOR CERTIFICATION - FTA

A BIDDER WILL NOT BE ELIGIBLE FOR AWARD OF A CONTRACT UNDER THIS INVITATION FOR BIDS UNLESS SUCH BIDDER HAS SUBMITTED AS A PART OF ITS BID THE FOLLOWING CERTIFICATION PERTAINING TO INELIGIBLE CONTRACTORS WHICH WILL BE DEEMED A PART OF THE RESULTING CONTRACT.

The Northern Contracting Corp.

hereby

(Name of Individual or Concern submitting this bid)

certifies that IT IS NOT INCLUDED on the U.S. Comptroller General's

Consolidated List of Parties Excluded from Federal Procurement and Nonprocurement Programs for Violations of Various Public Contracts Incorporating Labor Standards Provisions.

Northern Contracting Corp.

(Name of authorized representative of Bidder)

EEO CERTIFICATION AND DBE ASSURANCE

It is a condition of this Contract, and shall be made a condition of each subcontract entered into pursuant to this Contract, that the Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to his health or safety, as determined under construction safety and health standards (Title 29, Code of Federal Regulations, Part 1518, published in the Federal Register on April 17, 1971) promulgated by the United States Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act, (83 Stat. 96).

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.

The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained in the Appendices of the Supplementary Conditions in this Contract. The Contractor receiving the award of the Contract shall be required to obtain from each of its subcontractors and submit to the Contracting or administering agency prior to the performance of any work under said Contract a certification by said subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in these Appendices.

THE BIDDER ALSO CERTIFIES AND ASSURES THAT HE WILL MAKE SUFFICIENT REASONABLE EFFORTS TO MEET THE DISADVANTAGED BUSINESS ENTERPRISE (DBE) STATED GOAL ESTABLISHED FOR THIS CONTRACT.

Full name and address of the individual or concern submitting this bid:

Company Name: Northern Contracting Corp.

Address Line 1: 68 Jackson St.,

Address Line 2:

City/State/Zip: Canton, MA 02021

Title: President

Date: 09/03/15 (mm/dd/yy)

NOTICE: The person's title should be given, such as "owner" in the case of an individual, "partner" in the case of a general partnership, "president", "treasurer" or other authorized officer in the case of a Corporation.

BIDDERS MUST SET FORTH, ACCURATE AND COMPLETE INFORMATION AS REQUIRED BY THIS SOLICITATION. FAILURE TO DO SO MAY RENDER THE OFFER NONRESPONSIVE OR UNACCEPTABLE.

Contract #:R20CN01 Bid Forms and Supplements Check: FDCA93E6

BIDDER'S DATA INCLUDING BUSINESS TYPE

NOTE: If the Bidder is a corporation, indicate state of incorporation; if a partnership, give full Names and addresses of all partners; if an individual, give residential address if different from business address; and if joint ventures, give names and addresses of all firms of the joint venture.

If a Corporation

Incorporated in what State: MA

President: Paul F. Sciaba

Treasurer: Paul F. Sciaba

Secretary: Anthony B. Sciaba

If a Partnership (Name all Partners):

Name of Partner:

Residence:

Name of Partner:

Residence:

If an Individual:

Name:

Residence:

If an Individual Doing Business Under a Firm Name:

Name of Firm:

Name of Individual:

Business Address:

Residence:

BIDDER'S DATA INCLUDING BUSINESS TYPE (cont'd)

NOTE: If the Bidder is a corporation, indicate state of incorporation; if a partnership, give full Names and addresses of all partners; if an individual, give residential address if different from business address; and if joint ventures, give names and addresses of all firms of the joint venture.

If a Joint Venture:

Name of Venture:

Business Address:

Name of Firm or Corporation:

Address:

Name of Firm or Corporation:

Address:

Name of Firm or Corporation:

Address:

Name of Firm or Corporation:

Address:

If any of the joint ventures is a corporation a copy of the vote of the corporation authorizing the joint venture should be submitted to the MBTA.

The proposed surety on the bond to be given is:

Name: International Fidelity Insurance Company

Home Office Address Line 1: One Newark Center

Home Office Address Line 2: 20th Floor

City/State/Zip: Newark, NJ 07102

Massachusetts Address Line 1 (If Different): 80 Hingham St.,

Massachusetts Address Line 2 (If Different): Suite 205S

City/State/Zip: Rockland, MA 02370

AFFIDAVIT OF NON-COLLUSION

State of Massachusetts

ss. : (Date) 09/03/15 (mm/dd/yy)

County Norfolk

The undersigned being duly sworn, deposes and says that he is the
President of a corporation

of Northern Contracting Corp.

(Name of bidders as appearing in submitted bid)

for work in Newton on 09/03/15 (mm/dd/yy);

(City / Town)

(opening date of bids)

and certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

Paul F. Sciaba

Name of Person Making Affidavit

09/03/15 (mm/dd/yy)

Date

BUY AMERICA CERTIFICATE

Date: 09/03/15 (mm/dd/yy)

Name: Paul F. Sciaba

Company Name: Northern Contracting Corp.

Title: Partner

Certification requirement for procurement of steel, iron, or
manufactured products: A[X] B[]

A: Certificate of Compliance with 49 U.S.C. 5323(j)(1)

The bidder hereby certifies that it will meet the requirements of
49 U.S.C. 5323(j)(1) and the applicable regulations in 49 CFR Part
661.

OR

B: Certificate of Non-Compliance with 49 U.S.C. 5323(j)(1)

The bidder hereby certifies that it cannot comply with the
requirements of 49 U.S.C. 5323(j)(1), but it may qualify for an
exception pursuant to 49 U.S.C. 5323(j)(2)(B) or (j)(2)(D) and the
regulations in 49 Part CFR 661.7.

A BIDDER WILL NOT BE ELIGIBLE FOR AWARD OF ANY CONTRACT UNDER THIS INVITATION FOR BIDS UNLESS SUCH BIDDER HAS SUBMITTED AS PART OF ITS BID THE FOLLOWING CERTIFICATION WHICH WILL BE DEEMED A PART OF THE RESULTING CONTRACT.

RIGHT-TO-KNOW LAW

CERTIFICATION

The Bidder hereby certifies that, if awarded this Contract, he will fully comply with the Massachusetts Right-to-Know Law, c. 470 of the Acts of 1983, (the Act.). In addition, he shall:

1. Obtain a Material Safety Data Sheet, (MSDS), for all substances or mixtures of substances which appear on the Massachusetts Substance List that he or any of his subcontractors brings to or uses on the worksite and will keep a copy of that MSDS on the worksite of this Contract.
2. Label each container of a substance or mixture of substances on the Massachusetts Substance List as required in §7 of the Act.
3. Provide the same training and non-technical instruction that he is required to provide under §15 of the Act to all MBTA employees who are exposed to the substance or to the mixture of substances. Training shall include instruction on the nature and effects of any substance or mixture of substances listed on the Massachusetts Substance List which the Bidder or any of his subcontractors brings to or uses on the worksite.
4. Provide to MBTA employees on the worksite the same protective equipment that the Bidder or any of his subcontractors provides to his employees.

I agree to all stipulations listed above. Yes[X] No[]

Paul F. Sciaba

Name of Authorized Representative of Bidder

Address of Bidder Line 1: 68 Jackson St

Address of Bidder Line 2: -----

City/State/Zip: Canton, MA 02021

CERTIFICATION OF DUMPING FACILITIES

I, Paul F. Sciaba

have adequate dumping facilities available at:

Address Line 1: New England Recycling

Address Line 2: 569 Winthrop Street

City/State/Zip: Taunton, MA 02780

and that these facilities will be used in connection with work
undertaken on this Contract and that such use will be in a manner
compliant with State and Local requirements.

Paul F. Sciaba

Authorized Representative of Bidder

Address of Bidder Line 1: 68 Jackson St

Address of Bidder Line 2:

City/State/Zip: Canton, MA 02021

Date: 09/03/15 (mm/dd/yy)

CERTIFICATION OF EXAMINATION OF AVAILABLE SUBSURFACE DATA

Bidder certifies that it has either examined (yes) or not examined (no) the available Subsurface Conditions Data listed in Article 1.4 of the Instruction to Bidders.

A. GEOTECHNICAL Yes[X] No[] N/A[]

B. ENVIRONMENTAL Yes[X] No[] N/A[]

Paul F. Sciaba

(Authorized Representative of Bidder)

Northern Contracting Corp.

(Name of Firm or Corporation)

Business Address Line 1: 68 Jackson St

Business Address Line 2: -----

City/State/Zip: Canton, MA 02021

Date: 09/03/15 (mm/dd/yy)

CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
INELIGIBILITY AND VOLUNTARY EXCLUSION

The Primary Participant (potential contractor for a major third party contract) certifies to the best of its knowledge and belief, that it, and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal, State or local department or agency.
2. Have not within a three-year period preceding this bid been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicted for or otherwise criminally charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph, (2) of this certification; and
4. Have not within a three-year period preceding this bid had one or more public transactions (Federal, State or local) terminated for cause of default.

If the Primary Participant (potential contractor for a major third party contract) is unable to certify to any of the statements in this certification with respect to it or its principals, the Bidder shall submit an explanation to the Authority).

THE PRIMARY PARTICIPANT (POTENTIAL CONTRACTOR FOR A MAJOR THIRD PARTY CONTRACT) CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.

Primary Participant: Northern Contracting Corp.

(Name)

Title of Authorized Official: President

The undersigned chief legal counsel for the
Northern Contracting Corp.

hereby certifies

that Paul F. Sciaba

has authority

Authorized Official

under State and local law to comply with the subject assurances and that the certification above has been legally made.

Anthony B. Sciaba

09/03/15

Name of Applicant's Attorney

Date (mm/dd/yy)

Contract #:R20CN01 Bid Forms and Supplements Check: FDCA93E6
Debarment - 00410 - 14

CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
INELIGIBILITY AND VOLUNTARY EXCLUSION (cont'd)

Primary Covered Transactions

1. By signing and submitting this Proposal the prospective participant is providing the certification in accordance with 49 CFR Part 29.
2. The inability of a person to provide the certification will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of this prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
3. The certification is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this agreement.
6. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion -Lower Tier Covered Transaction", without modification, in all lower tier covered transactions and in all solicitations for lowered tier covered transactions.
7. Except for transactions authorized under paragraph (5) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

CERTIFICATION OF RESTRICTIONS ON LOBBYING

No Federal appropriated funds have been paid, or will be paid, by or on behalf of the undersigned, to any person for the influencing or the attempting to influence an officer or employee of any agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant the making of any Federal loan, the entering of any cooperative agreement and the extension, continuation, renewal, Amendment, or modification of any cooperative of any Federal contract, grant, loan or agreement.

THE PRIMARY PARTICIPANT (POTENTIAL CONTRACTOR FOR A MAJOR THIRD PARTY CONTRACT) CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.

Primary participant: Northern Contracting Corp.

Title of Authorized Official: President

The undersigned chief legal counsel for the
Northern Contracting Corp.

hereby certifies that Paul F. Sciaba

(Authorized Official)

has authority under State and local law to comply with the subject assurances and that the certification above has been legally made.

Name of Applicant's Attorney: Anthony B. Sciaba

Date: 09/03/15 (mm/dd/yy)

CERTIFICATION OF CONSTRUCTION EQUIPMENT STANDARD COMPLIANCE

I, Paul F. Sciaba, hereby

(Name of Authorized Representative of Bidder)

certify that all diesel construction equipment used in this contract has emission control devices installed, such as oxidation catalysts or particulate filters on the exhaust system side of the diesel combustion engine equipment.

Authorized Representative of Bidder: Paul F. Sciaba

Address of Bidder Line 1: 68 Jackson St

Address of Bidder Line 2:

City/State/Zip: Canton, MA 02021

Date: 09/03/15 (mm/dd/yy)

CERTIFICATION OF UNDOCUMENTED WORKERS

Contractor Legal Name: Northern Contracting Corp.

INSTRUCTIONS:

Executive Order 481 applies to all state agencies in the Executive Branch, including all executive offices, boards, commissions, agencies, departments, divisions, councils, bureaus, and offices, now existing and hereafter established. As it is the policy of the Executive Branch to prohibit the use of undocumented workers in the connection with the performance of state and federal contracts, all contracts entered after February 23, 2007 require that consultants, contractors and vendors, as a condition of receiving Commonwealth funds under any Executive Branch contract, make the following certification:

As evidence by the signature of the Authorized Signatory below, the Contractor certifies that under the pains and penalties of perjury that the Contractor shall not knowingly use undocumented workers in the connection with the performance of all Executive Branch contracts; that pursuant to federal requirements, the Contractor, shall verify the immigration status of all workers assigned to such contract without engaging in unlawful discrimination; and that the Contractor shall not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker(s). The Contractor understands and agrees that breach of any of these terms during the period of each contract may be regarded as a material breach, subjecting the Contractor to sanctions, including but not limited to monetary penalties, withholding of payments, contract suspension or termination.

Date: 09/03/15 (mm/dd/yy)

Print Name: Paul F. Sciaba

Title: President

Telephone: 781-821-4200

Fax: 781-821-4201

Email: ncc@northerncontractingcorp.com

The Contractor is required to fill out this Certification only and may provide a copy of the signed Certification for any contract executed with Executive Branch Department. A copy of this Certification must be attached to the "record copy" of all contracts with Contractors with the Contracting Department.

CERTIFICATION OF WORK IN HARMONY AND OSHA TRAINING

M.G.L. Chapter 30, Section 39S-Certification of Work in Harmony and OSHA Training By signing this and submitting this bid or proposal, the prospective participant is providing the signed certification set out below.

The undersigned certifies under penalties of perjury, as required by M.G.L. Chapter 30, Section 39S: That the contractor is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration.

Additionally, the contractor shall comply with provisions set forth in Chapter 30 Section 39S and referenced in Specification 07000 - General Conditions, Section 5.15.K.2. Please note that this certification must be passed on to any and all contracts and subcontracts between the General Contractor and other parties.

Date: 09/03/15 (mm/dd/yy)

Authorized Bidder: Northern Contracting Corp.

Title: President

Address of Bidder Line 1: 68 Jackson St

Address of Bidder Line 2:

City/State/Zip: Canton, MA 02021

CONTRACTOR CERTIFICATION
MBTA RETIREE PARTICIPATION DISCLOSURE

In accordance with the MBTA Hiring of MBTA Retirees Policy, Section 3.3 dated June 5, 2009, THE CONTRACTOR IS REQUIRED TO NOTIFY THE MBTA THAT A MBTA RETIREE HAS BEEN INCLUDED AS A MEMBER OF ITS TEAM.

Every contractor is required to notify the MBTA as part of the bidding process that a MBTA retiree will be included as a member of its team. The contractor shall be required to provide the name and date of retirement for each MBTA retiree on the team. Every MBTA retiree working for the MBTA under this condition shall do so in accordance with MGL, Chapter 268A, Section 5.

The Contractor certifies that the following MBTA Retirees are assigned to the team for this contract. Use additional pages as necessary.

Project Name: Work Platform for Riverside Car house

Firm Name	Retiree Name	MBTA Retirement Date (mm/dd/yy)
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Authorized Bidder: Northern Contracting Corp.

Title: President

Name of Firm or Corporation: Northern Contracting Corp.

Date: 09/03/15 (mm/dd/yy)

Project Number: R20CN01

Project Description: Work Platform for Riverside Car house

The Bidder Northern Contracting Corp.

has identified the Disadvantaged Business Enterprises listed below:

DBE SUBCONTRACTOR NAME: Richard W. Reid Electrical

ADDRESS: 6 Dunham Rd., Unit J,

USED AS: SubContractor

PROJECTED WORK START DATE:10/26/15 PROJECTED WORK FINISH DATE:08/16/16

NAIC CODE(S): 238210 238210 238210 238210 238210

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
0001	0130174	MAINTENANCE	LS	1.000	245900.00000	245900.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

245,900.00

DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)

\$245,900.00

DBE SUBCONTRACTOR NAME: Fire Code Design LLC

ADDRESS: 195 Dudley Street

USED AS: SubContractor

PROJECTED WORK START DATE:10/26/15 PROJECTED WORK FINISH DATE:08/16/16

NAIC CODE(S): 541690 541690 541690 541690 541690

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
0001	0130174	MAINTENANCE	LS	1.000	85000.00000	85000.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

85,000.00

DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)

\$85,000.00

TOTAL DBE COMMITMENT FOR VENDOR:

Entered: 12.85% or 330900.00

Required: 10.00% or 257410.00

<GOAL MET>

BID BOND
MBTA
10 PARK PLAZA, BOSTON, MA

KNOW ALL MEN BY THESE PRESENTS THAT Northern Contracting Corp. as principal, and International Fidelity Insurance Company as surety, who is duly licensed to act as surety in the Commonwealth of Massachusetts, are held and firmly bound unto the Massachusetts Bay Transportation Authority through Massachusetts Bay Transportation Auth as obligee. Not to be less than 5% of the bid price, lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of the above obligation is such that whereas the Principal has submitted to the Obligee /Owner a certain Bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for the:

Work Platform for Riverside Car house

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that if the bid shall be rejected or if the principal shall be awarded the contract for which the bid is submitted and shall execute the contract and give bond for the faithful performance thereof within fourteen (14) days after the award of same to the principal, then this obligation shall be null and void; but if the principal fails to so execute such contract and give performance bond as required by MGL Chapter 30, §39M, the surety shall, upon demand, forthwith pay to the obligee the amount set forth in the first paragraph hereof. The Surety for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall in no way be impaired or affected by any extension of time within which the Obligee/ Owner may accept the Bid and said Surety waives notice of any such extension. Provided further, that the bid may be withdrawn as provided by Section 00200 Article 1.8 of the Standard Specifications.

Company/Bidder Name: Northern Contracting Corp.
Electronic Bid Bond ID#: SMA15373749
Registry: surety2000
Surety Company: International Fidelity Insurance Company

00000

Amended for added Addenda 08/31/2015 12:04 PM

CONTRACT AND BOND FORMS

CONTRACT

Individual Form

00510-2 - 00510-3

Corporation Form

00510-4 - 00510-5

PERFORMANCE BOND

00510-6 - 00510-7

LABOR AND MATERIALS PAYMENT BOND

00510-8

ESCROW BID DOCUMENTS

00510-9 - 00510-20

NOTE: Bond Forms are not to be filled out when submitting Bid Form.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

CONTRACT

Clause 1. - This agreement, made this _____ day of _____
in the year two thousand and _____ between the Massachusetts Bay Transportation
Authority, and _____,
herein called the Contractor.

Clause 2. - Witnesseth, that the parties to this agreement, each in consideration of the agreements on
the part of the other herein contained, do hereby agree, the Massachusetts Bay Transportation Authority for
itself, and said Contractor for himself/themselves and his/their heirs, executors, administrators and assigns, as
follows:

The Contractor agrees to furnish all equipment, machinery, tools and labor, to furnish and deliver all
materials required to be furnished and delivered in and about the improvement and to do and perform all work
under

in strict conformity with the provisions herein contained and of the Notice to Bidders, Bid Form,
Supplementary Conditions, Addenda, and Specifications hereto attached and with plans referred to therein.
All Specifications, Supplementary Conditions, Plans, Notice to Bidders, Addenda, and Bid Form are hereby
specifically made a part of this contract as fully and to the same effect as if the same had been set forth at
length herein.

Clause 3. - In consideration of the foregoing premises the Massachusetts Bay Transportation Authority
agrees to pay as full compensation for everything furnished and done by the Contractor under this Contract,
including all work required but not shown on the plans for the items herein mentioned, and also for all loss of
damage arising out of the nature of the work aforesaid, or from the action of the elements (except as excluded
in the Standard Specifications, Section 00700, Article 5.19, or the Supplementary Conditions thereto) or from
any delay or from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for
all risks of every description in connection with the work, and for all expenses incurred by or in consequence
of the suspension or discontinuance of the work as herein specified, and for well and faithfully completing the
work, and the whole thereof, as herein provided, such prices as are set out in the accompanying Bid Form and
for all work required, for which there is no item in the Bid Form, such compensation as is provided for in the
aforesaid Specifications.

In witness whereof, the said Contractor has/have hereto set his/their hands and seals, and the said Massachusetts Bay Transportation Authority has executed these present by its authorized representatives on the year and day above written.

By _____

Contractor

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

BY:

Francis A. DePaola, P.E.
General Manager

APPROVED AS TO FORM:

Tracy W. Klay
Deputy General Counsel-MassDOT/MBTA


Certificate of Corporate Vote

Re: MBTA Contract No. R20CN01- Work Platfors for Riverside Carhouse, Newton, MA

At an authorized meeting of the Board of Directors of Northern Contracting Corporation held on January 15, 2016 at which all of the Directors were present or waived notice, it was voted that Paul F. Sciaba, the President of Northern Contracting Corporation, be and was thereby authorized to execute all bids, contracts, bonds and other documents related to the above-referenced matter in the name of and on behalf of said company, and such execution of any document in the name of Northern Contracting Corporation or on its behalf be said Paul F. Sciaba shall be valid and binding on the Company.

A true copy,

ATTEST


Gaurang Parikh, Assistant Clerk,
Northern Contracting Corporation
68 Jackson St, Canton MA 020

I hereby certify that I am the Assistant Clerk of Northern Contracting Corporation and that Paul F. Sciaba is the duly elected President of said company and that the above vote has not been amended or rescinded and that it remains in full force and effect as of this date.


Gaurang Parikh (seal)

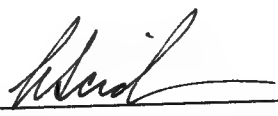
COMMONWEALTH OF MASSACUSETTS

Norfolk, ss..

January 15, 2016

On January 15, 2016 there appeared before me Gaurang Parikh, known by me to be the person whose signatures appear above and who swore or affirmed to me that the foregoing is complete and accurate to the best of his knowledge and belief.




ANTHONY B. SCIABA
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
January 30, 2020

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

CONTRACT

Clause 1. - This agreement, made this 2nd day of February, in the year two thousand and sixteen, between the Massachusetts Bay Transportation Authority, and Northern Contracting Corp. herein called the Contractor.

Clause 2. - Witnesseth, that the parties to this agreement, each in consideration of the agreement on the part of the other herein contained, do hereby agree, the Massachusetts Bay Transportation Authority for itself, and said Contractor for itself and its successors and assigns, as follows:

The Contractor agrees to furnish all equipment, machinery, tools and labor, to furnish and deliver all materials required to be furnished and delivered in and about the improvement and to do and perform all work under **MBTA Contract No. R20CN01 Work Platform for Riverside Car house**

in a sum not to exceed **Two Million Five Hundred Seventy Four Thousand One Hundred Dollars (\$ 2,574,100.00)** based upon a schedule of unit, lump sum and allowance bid prices, in strict conformity with the provisions herein contained and of the Notice to Bidders, Bid Form, Supplementary Conditions, Addenda, and Specifications hereto attached, and with the plans referred to therein. All plans, Specifications, Supplementary Conditions, Notice to Bidders, Addenda, and Bid Form are hereby specifically made a part of this contract as fully and to the same effect as if the same had been set forth at length herein.

Clause 3. - In consideration of the foregoing premises the Massachusetts Bay Transportation Authority agrees to pay and the Contractor agrees to receive as full compensation for everything furnished and done by the Contractor under this contract, including all work required but not shown on the plans for the items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements (except as excluded in the Standard Specifications, Section 00700, Article 5.19 or the Supplementary Conditions thereto) or from any delay or from an unforeseen obstruction or any difficulty encountered in the prosecution of the work, and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work as herein specified, and for well and faithfully completing the work, and the whole thereof, as herein provided, such prices as are set out in the accompanying Bid Form, and for all work required, for which there is no item in the Bid Form, such compensation as is provided for in the aforesaid Specifications.

In witness whereof, the said Contractor has caused these presents to be signed in its name and behalf and its corporate seal to be hereto affixed by

Its PRESIDENT

and *Mish* its CLERK/SECRETARY

thereto duly authorized, and the said Massachusetts Bay Transportation Authority has executed these presents by its authorized representatives on the year and day above written.

By: _____ PAUL F. SCIABA, PRESIDENT

NORTHERN CONTRACTING CORP. Contractor

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

BY

Francis A. DePaola

Francis A. DePaola, P.E.
General Manager

APPROVED AS TO FORM:

Susan D. Cobb

Susan D. Cobb
Deputy General Counsel, MBTA
Contracts and Procurement



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Frank DePaola, General Manager
Brian Shortsleeve, Chief Administrator

massDOT
Massachusetts Department of Transportation

Stephanie Pollack
Secretary and CEO
Mass DOT
Ten Park Plaza
Boston, Massachusetts 02116

received
1/4/14

Re: Massachusetts General Laws – Chapter 161A Section 3(f)-Request for
Contract Approval

Dear Secretary Pollack:

Pursuant to M.G.L. Chapter 161A, Section 3(f), the MBTA hereby submits, for the approval of the Secretary of MassDOT, the following contract award and supporting documentation:

Authorization for the execution of MBTA Contract No. R20CN01 – Work Platforms for Riverside Carhouse, Newton, MA with Northern Contracting Corp. for a sum not to exceed \$2,574,100.00

Award is based upon applicable Federal Procurement Regulations and guidelines, MBTA Regulations and Procedures, and Massachusetts General Laws regarding public construction contracts.

If your approval is hereby granted, kindly sign below and return a copy of letter to the undersigned.

Sincerely,

Francis A. DePaola, P.E.
General Manager

APPROVED: _____

Stephanie Pollack
Secretary and CEO



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, MassDOT Secretary & CEO
Frank DePaola, General Manager
Brian Shortsleeve, Chief Administrator

massDOT
Massachusetts Department of Transportation

Paul Sciaba
President
Northern Contracting Corp
68 Jackson Street
Canton, MA 02021

January 5, 2016

RE: MBTA Contract No. R20CN01 – Work Platforms for Riverside Carhouse, Newton,
MA

Notice of Award

Dear Mr. Sciaba ,

Please be advised that the Massachusetts Bay Transportation Authority has awarded referenced contract to your firm. Accordingly, a contract will be prepared for an amount not to exceed \$2,574,100.00 based upon the schedule of unit, lump sum and allowance bid prices submitted September 3, 2015.

It is requested that arrangements be made for furnishing of insurance certificates and execution of the contract and bond forms by your firm and surety with Ms. Margaret Hinkle, Senior Director of Contract Administration, (617) 222-3135, in accordance with the requirements of Article 1.19, Instructions to Bidders, of the Standard Specifications.

You are further advised that Mr. Edmond F. Hunter, Assistant General Manager for Design and Construction, is designated as the Engineer in the management of this contract.

Sincerely,

Francis A. DePaola, P.E.
General Manager

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that Northern Contracting Corp.
68 Jackson Street, Canton, Ma 02021 as Principal, hereinafter called Contractor, and

International Fidelity Insurance Company, One Newark Center, Newark, NJ 07102

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto Massachusetts Bay Transportation Authority as Oblige, hereinafter called Authority, in the amount of

Two Million Five Hundred Seventy Four Thousand One Hundred Dollars

(\$ 2,574,100.00) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated February 2, 2016, entered into a contract with the Authority for MBTA Contract No. R20CN01 which contract is by reference made a part hereof, and is hereinafter referred to as the Contract. **Work Platforms for Riverside Carhouse**

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Authority.

Whenever Contractor shall be, and is declared by the Authority to be in default under the Contract, the Authority having performed Authority's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or
- 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Authority elects, upon determination by the Authority and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and the Authority, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by the Authority to Contractor under the Contract and any amendments thereto, less the amount properly paid by the Authority to Contractor.

CONFORMED

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Authority or the heirs, executors, administrators or successors of the Authority.

Signed and sealed this 2nd day of February 20 16.

WITNESS:

PRINCIPAL:

Parish

Northern Contracting Corp.

(Seal)

(Title)

Paul F. Sciaba, President

WITNESS:

SURETY:

Wilder Parks, Jr.

International Fidelity Insurance Company (Seal)

Wilder Parks, Jr., Attorney-in-Fact

*Attach hereto proof of authority of officers or agents to sign bond.

LABOR AND MATERIALS PAYMENT BOND

Know all men by these presents, that Northern Contracting Corp.

68 Jackson Street, Canton, Ma 02021

principal, and

International Fidelity Insurance Company, One Newark Center, Newark, NJ 07102

surety, are held and firmly bond unto the Massachusetts Bay Transportation Authority (MBTA) in the sum of Two Million Five Hundred Seventy Four Thousand One Hundred Dollars

(\$2,574,100.00) lawful money of the United States of America, to be paid to the MBTA, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said principal has made a contract with the MBTA for the construction of MBTA Contract No. R20CN01 Now the condition of this obligation is such that if the principal and its subcontracts shall pay for all labor performed or furnished and for all materials and equipment used or employed in said contract and in: any and all duly authorized modifications, alterations, extensions, changes or additions thereto, all as set forth in Massachusetts General Laws, Chapter 149 Section 29 and Chapter 30 Section 39A, then this obligation shall become null and void; otherwise it shall remain in full force and virtue, the rights and obligations of the principal, the surety and claimants being as set forth in said M.G.L. c. 149 29.

The surety hereby stipulates and agrees that no change or modification in, or extension of time, or alterations or additions to the contract or in the work shall in any way affect its obligations on this Bond and does hereby waive notice of any such change, modification, extension, alteration or addition.

In witness whereof we hereunto set our hands and seals this 2nd day of February 2016

Northern Contracting Corp.

(Print Name of General Contractor/ Principal)

By:

(Signature - Title) Paul F. Sciaba, President

International Fidelity Insurance Company

(Seal)

(Print Name of Surety)

By:

Wilder Parks, Jr., Attorney-in-Fact

Business Address One Newark Center, Newark, NJ 07102

Countersigned MA Resident Agent by DeSanctis Insurance Agency

Address 100 Unicorn Park Drive, Woburn, MA 01801

Telephone No. 781-935-8480

Attach herewith proof of authority of officers or agents to sign the bond.

CONFORMED

POWER OF ATTORNEY

INTERNATIONAL FIDELITY INSURANCE COMPANY ALLEGHENY CASUALTY COMPANY

ONE NEWARK CENTER, 20TH FLOOR NEWARK, NEW JERSEY 07102-5207

KNOW ALL MEN BY THESE PRESENTS: That INTERNATIONAL FIDELITY INSURANCE COMPANY, a corporation organized and existing under the laws of the State of New Jersey, and ALLEGHENY CASUALTY COMPANY a corporation organized and existing under the laws of the State of Pennsylvania, having their principal office in the City of Newark, New Jersey, do hereby constitute and appoint

GREGORY D. JUWA, ADAM W. DESANCTIS, MICHAEL T. GILBERT, WILDER PARKS, JR.,
JAMES J. AXON, MICHAEL F. CARNEY, BRYAN F. JUWA, DAVID A. BOUTIETTE, PAUL A. PATALANO,
CHRISTINE B. GALLAGHER, REBECCA SHANLEY, RICHARD F. CARUSO

Woburn, MA.

their true and lawful attorney(s)-in-fact to execute, seal and deliver for and on its behalf as surety, any and all bonds and undertakings, contracts of indemnity and other writings obligatory in the nature thereof, which are or may be allowed, required or permitted by law, statute, rule, regulation, contract or otherwise, and the execution of such instrument(s) in pursuance of these presents, shall be as binding upon the said INTERNATIONAL FIDELITY INSURANCE COMPANY and ALLEGHENY CASUALTY COMPANY, as fully and amply, to all intents and purposes, as if the same had been duly executed and acknowledged by their regularly elected officers at their principal offices.

This Power of Attorney is executed, and may be revoked, pursuant to and by authority of the By-Laws of INTERNATIONAL FIDELITY INSURANCE COMPANY and ALLEGHENY CASUALTY COMPANY and is granted under and by authority of the following resolution adopted by the Board of Directors of INTERNATIONAL FIDELITY INSURANCE COMPANY at a meeting duly held on the 20th day of July, 2010 and by the Board of Directors of ALLEGHENY CASUALTY COMPANY at a meeting duly held on the 15th day of August, 2000:

"RESOLVED, that (1) the President, Vice President, Chief Executive Officer or Secretary of the Corporation shall have the power to appoint, and to revoke the appointments of, Attorneys-in-Fact or agents with power and authority as defined or limited in their respective powers of attorney, and to execute on behalf of the Corporation and affix the Corporation's seal thereto, bonds, undertakings, recognizances, contracts of indemnity and other written obligations in the nature thereof or related thereto; and (2) any such Officers of the Corporation may appoint and revoke the appointments of joint-control custodians, agents for acceptance of process, and Attorneys-in-fact with authority to execute waivers and consents on behalf of the Corporation; and (3) the signature of any such Officer of the Corporation and the Corporation's seal may be affixed by facsimile to any power of attorney or certification given for the execution of any bond, undertaking, recognizance, contract of indemnity or other written obligation in the nature thereof or related thereto, such signature and seals when so used whether heretofore or hereafter, being hereby adopted by the Corporation as the original signature of such officer and the original seal of the Corporation, to be valid and binding upon the Corporation with the same force and effect as though manually affixed."

IN WITNESS WHEREOF, INTERNATIONAL FIDELITY INSURANCE COMPANY and ALLEGHENY CASUALTY COMPANY have each executed and attested these presents on this 22nd day of July, 2014.



STATE OF NEW JERSEY
County of Essex

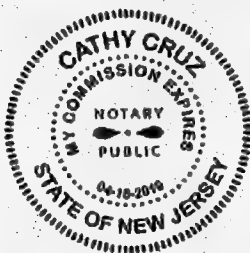
Robert W. Minster

ROBERT W. MINSTER
Chief Executive Officer (International Fidelity Insurance Company) and President (Allegheny Casualty Company)



On this 22nd day of July 2014, before me came the individual who executed the preceding instrument, to me personally known, and, being by me duly sworn, said he is the therein described and authorized officer of INTERNATIONAL FIDELITY INSURANCE COMPANY and ALLEGHENY CASUALTY COMPANY; that the seals affixed to said instrument are the Corporate Seals of said Companies; that the said Corporate Seals and his signature were duly affixed by order of the Boards of Directors of said Companies.

IN TESTIMONY WHEREOF, I have hereunto set my hand affixed my Official Seal, at the City of Newark, New Jersey the day and year first above written.



Cathy Cruz

A NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 16, 2019

CERTIFICATION

I, the undersigned officer of INTERNATIONAL FIDELITY INSURANCE COMPANY and ALLEGHENY CASUALTY COMPANY do hereby certify that I have compared the foregoing copy of the Power of Attorney and affidavit, and the copy of the Sections of the By-Laws of said Companies as set forth in said Power of Attorney, with the originals on file in the home office of said companies, and that the same are correct transcripts thereof, and of the whole of the said originals, and that the said Power of Attorney has not been revoked and is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto set my hand this

2nd day of February, 2016

Maria H. Branco

MARIA BRANCO, Assistant Secretary

SECTION 00510
ESCROW BID DOCUMENTS

THE REQUIREMENTS

A. Scope

1. The purpose of this specification is to preserve the bid documents of the successful bidder (Contractor) for use by the parties in any claims, change orders, or litigation between the Authority and Contractor arising out of this contract.
2. The low bidder shall submit one (1) legible copy of all documentary information including, but not limited to, electronic files generated in preparation of bid prices for this project. This material is hereinafter referred to as "Escrow Bid Documents." The term "Escrow Bid Documents" as used in this specification means all writings, working papers, computer print outs, charts, and all other data compilations which contain or reflect information, data and calculations used by the Contractor to determine the bid in bidding for this project. The term "Escrow Bid Documents" also includes any manuals which are standard to the industry used by the Contractor in determining the bid to this project. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the Publication and the Publisher. The term does not include bid documents provided by the Authority for use by the Contractor in bidding on this project.
3. The low bidder shall certify that the Escrow Bid Documents constitute all of the information used in preparation of the Bid, and that no other bid preparation information shall be considered in resolving disputes or claims. The successful bidder also agrees that nothing in the Escrow Bid Documents shall change or modify the terms or conditions of the Contract Documents. In the event the Contractor omits information used in estimating its costs for the bid, then the Contractor will forfeit the ability, in connection with any claim, change, or litigation, to prove what it carried in its bid for the cost of the relevant item of work for which the information was omitted. For example, if the contractor has a claim for labor or material escalation and it omits from the Escrow Bid Documents the worksheets it prepared or the supplier quotes it received for the labor or materials for which escalation is claimed, then the Contractor will be precluded from presenting evidence of what it actually carried in its bid for labor or material.

B. Submittal of Escrow Bid Documents

1. The Escrow Bid Documents are to be submitted to the following Escrow Agent:

ATTN:

Robinson & Cole LLP
One Boston Place, Suite 2500
Boston, Ma 02108
Attn: Matthew Lawlor, Esquire
Phone: (617) 557-5948

2. The low bidder will be required to execute an escrow agreement with the Authority and the Escrow Agent in the form attached as Exhibit 3. The low bidder shall submit a signed Escrow Agreement in triplicate and the Escrow Bid Documents to the Escrow Agent in a sealed container acceptable to the Escrow Agent, no later than five business days following the Notice of Award. 24-hour advance notice to the Escrow Agent is required prior to submitting the Escrow Bid Documents. The construction contract will not be executed until the Bid Documentation Certification (Exhibit 1) and the Bid Documentation Delivery Certification (Exhibit 2) has been delivered as set forth in section B.3. The container shall be clearly marked "Bid Documentation" and shall also show on the face of the container the Contractor's name, the date of submittal and the Contract Number. Compliance with the provisions of Section 00510 is within the discretion of the Authority.
3. The bidder shall obtain certification from the Escrow Agent in the form attached as Exhibit 2 and will deliver that acknowledgement and a copy of the Bid Documentation Certification form (Exhibit 1) to the Authority within said 5 days.
4. The Escrow Bid Documents shall be accompanied with the certification (attached as Exhibit 1) signed by an individual authorized by the Bidder to execute Bids, stating that the material in the Escrow Bid Documents constitutes all the documentary information used in preparation of the Bid and that the Bidder has personally examined the contents of the Escrow Bid Documents container and has found that the documents in the container are complete and meets the requirements of this Section 00510.

C. Ownership

1. The Escrow Bid Documents are, and shall always remain, the property of the Contractor, subject to joint review by the Authority and the Contractor as provided herein. The Escrow Bid Documents are proprietary and secret information belonging to the Contractor.
2. The Authority stipulates and expressly acknowledges that the Escrow Bid Documents, as defined herein, constitute trade secrets. This acknowledgement is based on the Authority's express understanding that the information contained in the Escrow Bid Documents is not known outside the Bidder's business, is known only to a limited extent and only to a limited number of employees of the Bidder, is safeguarded while in the Bidder's possession, is extremely valuable to the Bidder and could be extremely valuable to the Bidder's competitor by virtue of it reflecting the Bidder's contemplated techniques of construction. The Authority acknowledges that the Bidder expended substantial sums of money in developing the information included in the Escrow Bid Documents and further acknowledges that it would be difficult for a competitor to replicate the information contained therein. The Authority further acknowledges that the Escrow Bid Documents include a compilation of information used in the bidder's business, intended to give the Bidder an opportunity to obtain an advantage over competitors who do not know of or use the contents of the documentation. The Authority further agrees to safeguard the Escrow Bid Documents, and all information contained therein, against disclosure to the fullest extent permitted by law.

D. Purpose

1. The purpose of the Escrow Bid Documents procedure is intended to create a spirit of cooperation in an atmosphere of honesty between the Authority and the Contractor.
2. Escrow Bid Documents will be used to assist in the negotiation of price adjustments and Change Orders and in the settlement of disputes and claims. They will not be used for pre-award evaluation of the contractor's anticipated methods of construction or to assess the contractor's qualifications for performing work.

E. Format and Content

1. Bidders may submit Escrow Bid documents in their usual cost estimation format; provided that all information is clearly presented and ascertainable. It is not the intention of this Article to cause the Bidder extra work during the preparation of the Bid, but to ensure that the Escrow Bid Documents will be adequate to enable complete understanding and proper interpretation for their intended use. The Escrow Bid Documents shall be in English.

F. Not used.

G. Payment:

There will be no separate payment for compilation of the data, container or cost of verification of the Escrow Bid Documents. All costs shall be included in the overall Contract bid price.

H. Storage

The Escrow Bid Documents of the successful low bidder will be placed in escrow for the life of the Contract with the Escrow Agent. The cost of storage will be paid by the Authority.

I. Examination

1. The Escrow Bid Documents shall be examined by both the Authority and the Contractor, at any time deemed necessary by the Authority and/or the Contractor; provided, however, that the Escrow Bid Documents may only be examined for the purpose of determining the costs carried in the Contractor's bid for those specific items of work that are the subject of negotiation of price adjustments and Change Orders or the settlement of disputes and claims. No other documents may be examined. The Authority may delegate review of relevant Escrow Bid Documents to members of its construction management staff and/or consultants.
2. Examination of the Escrow Bid Documents is subject to the following conditions:
 - a. As trade secrets, the Escrow Bid Documents are proprietary and confidential to the extent provided by law.

- b. Access to the Escrow Bid Documents may take place only in the presence of duly designated representatives of both the Authority and the Contractor. The AUTHORITY and CONTRACTOR shall provide written direction signed by the AUTHORITY and CONTRACTOR to the ESCROW AGENT directing that the Escrow Bid Documents be made available for such joint examination. The Authority or the Contractor shall give at least 5 business days written notice to the other's project manager of its request to examine the Escrow Bid Documents. Refusal by Contractor to be present or to cooperate in any way in the review of the documents after the provision of the written notice by the Authority, will be the basis for the Authority to reject the claim.
3. The Escrow Bid Documents at all times remain the property of the Contractor and the Authority will take all reasonable steps necessary to protect confidentiality to the fullest extent permitted by law.
4. The Authority agrees to notify the Contractor of its receipt of any request made pursuant to M.G.L.c.66§10 to inspect or examine any material contained in the Escrow Bid Documents.

J. Final Disposition

The Escrow Bid Documents will be promptly returned to the Contractor by the Escrow Agent when all of the following have occurred: all disputes regarding the contract work have been settled, the contract work completed and Final Payment has been made and accepted. The AUTHORITY and the CONTRACTOR shall provide joint written confirmation of the above to the ESCROW AGENT to allow the ESCROW AGENT to release the Escrow Bid Documents.

Exhibit 1

BID DOCUMENTATION CERTIFICATION

THE UNDERSIGNED HEREBY CERTIFIES THAT THE BID DOCUMENTATION CONTAINED HEREIN CONSTITUTES ALL OF THE INFORMATION USED IN PREPARATION OF THE BID; THAT NO OTHER BID PREPARATION INFORMATION SHALL BE CONSIDERED IN RESOLVING DISPUTES OR CLAIMS; AND THAT I HAVE PERSONALLY EXAMINED THESE CONTENTS AND HAVE FOUND THAT THIS BID DOCUMENTATION IS COMPLETE AND MEET THE REQUIREMENTS OF SECTION 00510.

SIGNATURE: 

NAME:

PAUL F. SCIABA

TITLE:

PRESIDENT

CONTRACT NO. R20CN01

CONTRACTOR: Northern Contracting Corp.

DATE:

JANUARY 19, 2016

EXHIBIT 2

Bid Documentation Delivery

---- CERTIFICATION ----

ROBINSON & COLE LLP, as ESCROW AGENT, identified in Massachusetts Bay Transportation Authority Contract No. R20CN01, hereby certifies that Northern Contracting Corp. [NAME OF BIDDER] as identified by ANTHONY SCIABA [REPRESENTATIVE OF BIDDER] has delivered to ESCROW AGENT's office for storage, a sealed container which BIDDER represents to be all documentation used in the preparation of BIDDER's bid, otherwise known as the "Escrow Bid Documents," as BIDDER represents it is required to do in accordance with the Contract Documents of the above referenced Contract, on this 19th day of JANUARY, 2016.

ROBINSON & COLE LLP

By: [Signature]

Name: Matthew J. Lawlor

Title: Partner

Exhibit 3

ESCROW AGREEMENT

This ESCROW AGREEMENT (this "Agreement") is dated the 19th day of January, 20 16, by and among the MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (the "MBTA" or the "AUTHORITY"); Northern Contracting Corp. ("BIDDER"); and Robinson & Cole LLP as Escrow Agent ("ESCROW AGENT").

RECITALS

WHEREAS, the AUTHORITY is a public body politic and corporate and political subdivision of the Commonwealth of Massachusetts created by Chapter 161A of the Massachusetts General Laws, as amended, which is presently engaged in a competitive bidding process governed by law to award a construction contract to the lowest responsible and eligible bidder for a construction project entitled R20CN01 (the "Contract"); and

WHEREAS, BIDDER has submitted a bid on the Contract and is the low bidder therefore; and

WHEREAS, Section 00510 of the documents for the Contract (the "Contract Documents") requires the low bidder to submit, within five business days following the Notice of Award, one copy of all documentary information generated in preparation of bid prices for the Contract, which information is hereinafter referred to as "Escrow Bid Documents," to ESCROW AGENT together with a certification in the form contained in the Contract Documents; and

WHEREAS, ESCROW AGENT, for stated consideration, is willing to assume the obligations of ESCROW AGENT as agreed herein;

NOW, THEREFORE, for consideration mutually acknowledged, the AUTHORITY, BIDDER and ESCROW AGENT hereby agree as follows:

1. Escrow of Bid Documents. BIDDER shall comply with the provisions of Section 00510 of the Contract Documents by delivering a complete copy of the Escrow Bid Documents to ESCROW AGENT in a sealed container acceptable to the Escrow Agent within the required time limit and otherwise complying with Section 00510 of the Contract Documents together with the required Bid Documentation Certification (Exhibit 1 of Section 00510). BIDDER will receive from ESCROW AGENT a Bid Documentation Delivery Certification (Exhibit 2 of Section 00510) at the time BIDDER delivers the Escrow Bid Documents to ESCROW AGENT. BIDDER will deliver an original of ESCROW AGENT's Bid Documentation Delivery Certification and a copy of BIDDER's Bid Documentation Certification to the AUTHORITY within the required time limit.

2. Protection of Bid Documents. The AUTHORITY shall comply with the provisions of Section 00510 of the Contract Documents regarding receipt, storage, and use of the Escrow Bid Documents and will safeguard the Escrow Bid Documents and all information contained therein against disclosure to the fullest extent permitted by law.

3. Holding of Bid Documents by ESCROW AGENT. ESCROW AGENT is hereby expressly authorized and agrees to receive, store, safeguard, release, and return the Escrow Bid Documents during the duration of the Contract as set forth in this Agreement.

4. Return/Release of Bid Documents. ESCROW AGENT is expressly authorized to release the Escrow Bid Documents only under the following circumstances:

(a) In order to return the Escrow Bid Documents to BIDDER if the AUTHORITY informs ESCROW AGENT in writing that BIDDER and the AUTHORITY have not executed the Contract; or

(b) For joint examination by the AUTHORITY and BIDDER after delivery of a written direction signed by both the AUTHORITY and BIDDER; or

(c) For return to BIDDER when ESCROW AGENT has received joint written confirmation from the AUTHORITY and BIDDER that all of the following have occurred: all disputes regarding the Contract work have been settled, the Contract work completed and Final Payment has been made and accepted; or

(d) Upon joint written direction from the Authority and Bidder, either under such circumstances as is provided for in Section 00510 of the Contract Documents, or as otherwise directed by mutual agreement of the AUTHORITY and BIDDER, which direction shall be delivered in writing by the AUTHORITY, signed by both parties, to ESCROW AGENT.

5. ESCROW AGENT's Obligations and Protection. AUTHORITY and BIDDER further acknowledge and agree as follows:

(a) That ESCROW AGENT (i) shall not be responsible for any of the agreements referred to herein but shall be obligated only for the performance of such duties as are specifically set forth in this Escrow Agreement; (ii) shall not be obligated to take any legal or other action hereunder which might in its judgment involve any expense or liability unless it shall have been furnished with acceptable indemnification; (iii) may rely on and shall be protected in acting or refraining from acting upon any written notice, instruction, instrument, statement, request or document furnished to it hereunder and believed by it to be genuine and to have been signed or presented by the proper person, and shall have no responsibility for determining the authenticity or accuracy thereof; and (iv) may consult counsel satisfactory to it, including counsel internal to ESCROW AGENT, and the opinion of such counsel shall be full and complete authorization and protection in respect of any action taken, suffered or omitted by it hereunder in good faith and in accordance with the opinion of such counsel.

(b) That neither ESCROW AGENT nor any of its partners, officers, or employees shall be liable to anyone for any action taken or omitted to be taken by it or any of its partners, officers, or employees hereunder except in the case of gross negligence or willful misconduct. The AUTHORITY and BIDDER, jointly and severally, covenant and agree to indemnify ESCROW AGENT and hold it harmless without limitation from any loss, liability, or expense of any nature incurred by ESCROW AGENT arising out of or in connection with this Agreement or with the administration of its duties hereunder, including but not limited to legal fees and other costs and expenses of defending or preparing to defend against any claim or liability unless such loss, liability, or expense shall be caused by ESCROW AGENT's willful misconduct or gross negligence. In no event shall ESCROW AGENT be liable for indirect, special, or consequential damages. Notwithstanding any provision of this Agreement to the contrary, ESCROW AGENT'S liability shall be limited to the value of its compensation hereunder.

(c) That the AUTHORITY shall pay or reimburse ESCROW AGENT for any legal fees incurred by ESCROW AGENT in connection with the preparation of this Agreement and in addition compensate ESCROW AGENT for its services hereunder in accordance with the Revised Estimate for

MBTA Bid Escrow Agent Services dated December 18, 2009. ESCROW AGENT shall be entitled to reimbursement on demand for all expenses incurred in connection with the administration of the escrow created hereby which are in excess of its compensation for normal services hereunder, including without limitation, payment of any legal fees incurred by ESCROW AGENT in connection with resolution of any claim by any party hereunder.

(d) That ESCROW AGENT may at any time for any reason or for no reason resign as ESCROW AGENT hereunder by giving sixty (60) days prior written notice of resignation to AUTHORITY and BIDDER. Prior to the effective date of the resignation as specified in such notice, AUTHORITY will issue to ESCROW AGENT a written instruction authorizing redelivery of the Escrow Bid Documents to another escrow agent that AUTHORITY selects subject to the reasonable consent of BIDDER. If, however, AUTHORITY shall fail to name such a successor escrow agent within forty (40) days after the notice of resignation from ESCROW AGENT, BIDDER shall be entitled to name such escrow agent within twenty (20) days. If no successor escrow agent is named by AUTHORITY or BIDDER within said sixty (60) day period, ESCROW AGENT may apply to a court of competent jurisdiction for appointment of a successor escrow agent.

(e) That ESCROW AGENT's service as escrow agent under this Agreement shall not be construed as constituting legal representation of either AUTHORITY or BIDDER and both AUTHORITY and BIDDER expressly acknowledge, with reference to the rules of professional conduct governing lawyers that ESCROW AGENT's service hereunder is not intended to prevent either the AUTHORITY or BIDDER from retaining ESCROW AGENT as its counsel in any matter, nor shall it be asserted by the AUTHORITY or BIDDER as grounds for disqualifying ESCROW AGENT from representing any client in a matter in which the AUTHORITY's and/or BIDDER's interests are directly adverse to or otherwise different from those of ESCROW AGENT's client. ESCROW AGENT will not knowingly disclose to any such client directly adverse to AUTHORITY and/or BIDDER any confidential information about AUTHORITY and/or BIDDER which ESCROW AGENT has acquired or will acquire pursuant to its services provided in accordance with this Agreement.

(f) That it is the intent of BIDDER and the AUTHORITY that the Escrow Bid Documents remain the sole property of BIDDER.

(g) That the AUTHORITY's maximum obligation under this Agreement is \$15,000. In the AUTHORITY's discretion, the maximum obligation may be increased by written agreement signed by the AUTHORITY and ESCROW AGENT.

6. Dispute Resolution. It is understood and agreed that should any dispute arise with respect to the delivery, ownership, right of possession, access to and/or disposition of the Escrow Bid Documents, or should any such claim be made upon such documents by a third party, ESCROW AGENT upon receipt of written notice of such dispute or claim by the parties hereto or by a third party, is authorized and directed to retain in its possession without liability to anyone, all or any of said Escrow Bid Documents until such dispute shall have been settled either by the mutual agreement of the parties involved or by a final order, decree, or judgment of a court of the United States of America, the time for perfection or any appeal of such order, decree, or judgment having expired. At any time after the ESCROW AGENT becomes aware of a dispute or claim or at any time after one year after the contract completion date in the Contract, ESCROW AGENT may, but shall be under no duty whatsoever to, after thirty days prior written notice to the AUTHORITY and BIDDER, institute or defend any legal proceedings related to the Escrow Bid Documents, including without limitation, commencement of an action in the nature of an interpleader in a court of competent jurisdiction, after depositing the Escrow Bid Documents therewith, for a determination of the

respective rights of the AUTHORITY and BIDDER, and, in such case, recover from the AUTHORITY, ESCROW AGENT's costs and expenses including reasonable attorneys' fees .

7. Consent to Jurisdiction and Service. AUTHORITY and BIDDER hereby absolutely and irrevocably consent and submit to the jurisdiction of the courts of the Commonwealth of Massachusetts and of any Federal court located in said Commonwealth in connection with any actions or proceedings brought against AUTHORITY and BIDDER brought by ESCROW AGENT arising out of or relating to this Escrow Agreement. In any such action or proceeding, AUTHORITY and BIDDER hereby absolutely and irrevocably agree that the service thereof may be made by certified or registered mail directed to AUTHORITY or BIDDER, as the case may be, at their respective addresses in accordance with Section 9 hereof.

8. Force Majeure. Neither AUTHORITY nor BIDDER nor ESCROW AGENT shall be responsible for delays or failure in performance resulting from acts beyond its control. Such acts shall include but not be limited to acts of God, strikes, lockouts, riots, acts of war, epidemics, governmental regulations imposed after the fact, fire, communication line failures, power failures, earthquakes or other disasters.

9. Notices. Any notice permitted or required hereunder shall be deemed to have been duly given if delivered personally or if mailed certified or registered mail, postage prepaid, to the parties at their addresses set forth below or to such other address as they hereafter designate.

If to AUTHORITY:

Massachusetts Bay Transportation Authority
10 Park Plaza, Room 6720
Boston, MA 02116
Attention: Assistant General Manager for Design and Construction
with a copy to MBTA Project Manager for the Contract

If to BIDDER:

NORTHERN CONTRACTING CORP.
68 JACKSON ST.
CANTON MA 02021
Attention: PAUL SCIABA

If to ESCROW AGENT:

Robinson & Cole LLP
One Boston Place, Suite 2500
Boston, MA 02108
Attention: Matthew J. Lawlor, Esq.

10. Binding Effect. This Agreement shall be binding upon the respective parties hereto and their heirs, executors, successors, and assigns.

11. Modification/Termination. This Agreement may not be altered, modified, or terminated without the express written consent of the parties hereto. No course of conduct shall constitute a waiver of any of the terms and conditions of this Agreement, unless such waiver is specified in writing, and then only to the extent so specified. A waiver of any terms and conditions of this Agreement on one occasion shall not constitute a waiver of the other terms of this Agreement, or of such terms and conditions or any other occasion.

12. Governing Law. This Agreement shall be governed by and construed under the laws of the Commonwealth of Massachusetts.

13. Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of such counterparts shall together constitute but one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement effective as of the day and year first written above.

AUTHORITY

MASSACHUSETTS BAY
TRANSPORTATION AUTHORITY

By: 

Name: Edmond F. Hunter

Title: Assistant General Manager for
Design and Construction

BIDDER


Northern Contracting Corp.

By: 

Name: PAUL F. SCIABA

Title: PRESIDENT

ESCROW AGENT

ROBINSON & COLE LLP

By: 

Name: Matthew J. Lawlor

Title: Partner

INSURANCE



NORTH-2

OP ID: LO

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

01/13/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER DeSanctis Insurance Agcy, Inc. 100 Unicorn Park Drive Woburn, MA 01801	CONTACT NAME: Wilder Parks, Jr.	FAX (A/C, No): 781-933-5645	
	PHONE (A/C, No, Ext): 781-935-8480	E-MAIL ADDRESS:	
INSURED Northern Contracting Corp. 68 Jackson Street Canton, MA 02021	INSURER(S) AFFORDING COVERAGE		NAIC #
	INSURER A : Acadia Insurance Company		31325
	INSURER B : Amguard Insurance Company		42390
	INSURER C : Nautilus Insurance Company		17370
	INSURER D : American Insurance Company		
	INSURER E :		
INSURER F :			

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY		CPA009092022	05/10/2015	05/10/2016	EACH OCCURRENCE \$ 1,000,000
	<input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR	DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 500,000				
	<input checked="" type="checkbox"/> Contractual Liab	MED EXP (Any one person) \$ 10,000				
	<input checked="" type="checkbox"/> XCU	PERSONAL & ADV INJURY \$ 1,000,000				
GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE \$ 2,000,000
<input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC						PRODUCTS - COMP/OP AGG \$ 2,000,000
OTHER:						\$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY		MAA009091222	05/10/2015	05/10/2016	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000
	<input type="checkbox"/> ANY AUTO	<input checked="" type="checkbox"/> SCHEDULED AUTOS				BODILY INJURY (Per person) \$
	<input type="checkbox"/> ALL OWNED AUTOS	<input checked="" type="checkbox"/> NON-OWNED AUTOS				BODILY INJURY (Per accident) \$
	<input checked="" type="checkbox"/> HIRED AUTOS					PROPERTY DAMAGE (Per accident) \$
						\$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR		CUA009093622	05/10/2015	05/10/2016	EACH OCCURRENCE \$ 10,000,000
	<input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE					AGGREGATE \$ 10,000,000
	<input type="checkbox"/> DED <input checked="" type="checkbox"/> RETENTION \$ 0					\$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	Y/N	NOWC633931	05/10/2015	05/10/2016	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	<input type="checkbox"/> N/A				E.L. EACH ACCIDENT \$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below					E.L. DISEASE - EA EMPLOYEE \$ 1,000,000
						E.L. DISEASE - POLICY LIMIT \$ 1,000,000
C	Pollution w/Mold		CPL200998612	10/16/2015	10/16/2016	Limits \$1M/5M
D	Excess Umbrella		SHZ00032199242	02/15/2016	02/15/2017	Limits \$15M/15M

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

"ADDITIONAL INSURED LIMITS ARE NO GREATER THAN REQUIRED BY WRITTEN CONTRACT"
RE: Work Platforms for Riverside Carhouse; Project: R20CN01. Massachusetts Bay Transportation Authority is Additional Insured on all policies except WC.
A Waiver of Subrogation in favor of the Additional Insured applies on all policies. In the event of a cancellation, a thirty (30) day notice will be

1/21/16
JAPB

CERTIFICATE HOLDER

CANCELLATION

MASSB-7 Massachusetts Bay Transportation Authority 10 Park Plaza Boston, MA 02116-3974	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

© 1988-2014 ACORD CORPORATION. All rights reserved.

NOTEPAD:

HOLDER CODE **MASSB-7**
INSURED'S NAME **Northern Contracting Corp.**

NORTH-2
OP ID: LO

PAGE 2

Date **01/13/2016**

provided to the Certificate Holder.



CERTIFICATE OF LIABILITY INSURANCE

NORTH-2

OP ID: LO

DATE (MM/DD/YYYY)

01/13/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
DeSanctis Insurance Agcy, Inc.
100 Unicorn Park Drive
Woburn, MA 01801

CONTACT NAME: Wilder Parks, Jr.

PHONE (A/C, No, Ext): 781-935-8480

FAX (A/C, No): 781-933-5645

E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE

NAIC #

INSURER A: Acadia Insurance Company

31325

INSURED Northern Contracting Corp.
68 Jackson Street
Canton, MA 02021

INSURER B:

INSURER C:

INSURER D:

INSURER E:

INSURER F:

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	COMMERCIAL GENERAL LIABILITY					EACH OCCURRENCE \$
	<input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR					DAMAGE TO RENTED PREMISES (Ea occurrence) \$
						MED EXP (Any one person) \$
						PERSONAL & ADV INJURY \$
						GENERAL AGGREGATE \$
						PRODUCTS - COMP/OP AGG \$
	GEN'L AGGREGATE LIMIT APPLIES PER:					\$
	<input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC					
	OTHER:					
	AUTOMOBILE LIABILITY					COMBINED SINGLE LIMIT (Ea accident) \$
	<input type="checkbox"/> ANY AUTO					BODILY INJURY (Per person) \$
	<input type="checkbox"/> ALL OWNED AUTOS	<input type="checkbox"/> SCHEDULED AUTOS				BODILY INJURY (Per accident) \$
	<input type="checkbox"/> HIRED AUTOS	<input type="checkbox"/> NON-OWNED AUTOS				PROPERTY DAMAGE (Per accident) \$
						\$
	UMBRELLA LIAB	<input type="checkbox"/> OCCUR				EACH OCCURRENCE \$
	EXCESS LIAB	<input type="checkbox"/> CLAIMS-MADE				AGGREGATE \$
	DED	RETENTION \$				\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY					PER STATUTE <input type="checkbox"/> OTH-ER <input type="checkbox"/>
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A				E.L. EACH ACCIDENT \$
	If yes, describe under DESCRIPTION OF OPERATIONS below					E.L. DISEASE - EA EMPLOYEE \$
						E.L. DISEASE - POLICY LIMIT \$
A	Builders Risk		CIM524016810	02/24/2015	02/24/2016	Limit 2,574,100 Deduct 2,500

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Work Platforms for Riverside Carhouse; Project: R20CN01. Massachusetts Bay Transportation Authority is Additional Insured.

1/21/16
JARP

CERTIFICATE HOLDER

MASSB-7

Massachusetts Bay
Transportation Authority
10 Park Plaza
Boston, MA 02116-3974

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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GENERAL CONDITIONS

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SECTION 00700

GENERAL CONDITIONS

PART 1 - DEFINITION OF TERMS

1.1 DEFINITION OF TERMS

A. Wherever in the Bid or Contract Documents the following terms, or pronouns in place of them, are used, the intent and meaning shall be as follows:

1. Acceptance - Formal written acceptance by the Authority of the completed Work.
2. Addenda - Written interpretations of and/or revisions to the Bid Documents issued by the Authority prior to opening of Bids.
3. Alteration - A change or substitution in the form, character, or detail of the Work done or to be done within the original scope of the Contract.
4. Authority - Massachusetts Bay Transportation Authority, created by Chapter 563, Section 18 of the Acts of 1964, of the Commonwealth, the Party of the First Part to the Contract.
5. Award - Award by the Authority of a Contract.
6. Bid - Offer of the Bidder for the Work when submitted on the prescribed Bid Form, properly signed, dated, and guaranteed, and which includes the schedule of bid items.
7. Bid Documents - Documents provided by the Authority for the purpose of soliciting Bids for the Work. Bid Documents will include, as applicable, Standard Specifications, Contract Specifications, Contract Drawings, MBTA Geotechnical Data Reports, Bid Form, and Addenda.
8. Bid Form - Forms issued by the Authority requesting bids for a specific Contract and includes the Notice to Bidders, Instructions to Bidders, and Form for Bid.
9. Bid Security (Bid Guaranty) - The cash, cashier's or treasurer's check, certified check, or Bidder's Bond accompanying the Bid submitted by the Bidder, as a guaranty that the Bidder will enter into a Contract with the Authority for the performance of the Work and furnish acceptable bonds and insurance if the Contract is awarded to the Bidder.
10. Bidder - An individual, firm, partnership, corporation, or combination thereof, submitting a Bid for the Work on the prescribed Bid Form.
11. Chairman of the Board of Directors of the Authority - Chief Executive Officer or designee, such designee acting within the scope of the particular duties entrusted to him.
12. Change Order - A document executed and issued to the Contractor by the Authority amending the Contract.
13. Commonwealth - Commonwealth of Massachusetts.

14. Contract Documents - The Standard Specifications, Contract Specifications, Bid, and Contract Drawings revised to incorporate all changes made during the Bid period by Addenda and to incorporate information included in the Bid accepted by the Authority and all authorized changes to the Contract issued subsequent to the execution of the Contract in accordance with the most recent MBTA Change Order Guidelines.
15. Contract - The written agreement executed by the Authority and the Contractor, setting forth the obligations of the Parties there under. Further, any and all executed changes made in accordance with the MBTA Change Order Guidelines.
16. Contract Administrator - Manager of the Office of Contract Administration or his designee.
17. Contract Bonds -
 - a. Performance Bond - A bond executed by the Contractor and the Contractor's Sureties in the full amount of the contract to ensure the faithful performance of the contract.
 - b. Labor and Materials Payment Bond - A bond executed by the Contractor and the Contractor's Sureties in the full amount of the Contract to ensure the payment of labor, materials, and rental of equipment.
18. Contract Drawings - Plans, profiles, typical cross sections, general cross sections, elevations, and details list as referenced on the Drawing Index, or amendments thereto, and working drawings and shop drawings approved by the Engineer, all of which show locations, character, dimensions, and details of the Work.
19. [NOT USED]
20. Contract Specifications - A set of documents issued by the Authority for the intended Work which includes the Notice to Bidders, Instructions to Bidders, Bid Form, Contract Forms, Contract Bond Forms, Supplementary Conditions, technical provisions, and other requirements, forms and exhibits identified therein.
21. Contract Time - Number of calendar days allowed or specified date(s) for completion of the Contract.
22. Contractor - The individual, firm, partnership, corporation, or combination thereof, private, municipal or public, including joint ventures, which, as an independent contractor, has entered into Contract with the Authority, as Party or Parties of the Second Part, and who is referred to throughout the Contract Documents by singular number.
23. Days - Every day shown on the calendar, Saturdays, Sundays and holidays included.
24. Engineer - The General Manager of the Authority or designee acting within the scope of the particular duties entrusted to this person.
 - a. Design Engineer and/or Consultant (name of Consultant firm) has been retained by the Authority as engineering consultant during the construction of (name of project). The terms "Design Engineer" and "Consultant" are at times interchangeable.
25. [NOT USED]

26. Extra Work - Work which is not included in the Contract as awarded but found to be necessary for the satisfactory completion of the Contract within its intended scope, and bears a reasonable subsidiary relation to the full execution of the Work originally described in the Contract.
27. Extra Work Order - An order in writing issued by the Engineer to the Contractor prior to performing the Extra Work, setting forth the Extra Work to be done, the basis of payment and time adjustments, if any. Following the issuance of an Extra Work Order, a Change Order will be executed to amend the Contract Documents.
28. Force Majeure - Acts of God, strikes, lockouts, riots, acts of war, epidemics, governmental regulations imposed after the fact, fire, communication line failures, power failures, earthquakes or other disasters.
29. Form for Bid - see Bid Form.
30. General Manager - Shall be the Chief Executive Officer of the Authority, and shall have general direction, supervision and control of the conduct of the business, property, personnel and affairs of the Authority except as may be otherwise prescribed by law or by the regulations of the Board of Directors.
31. General Terms - Wherever the words "required," "determined," "directed," "specified," "authorized," "ordered," "given," "designated," "considered necessary," "deemed necessary," "Permitted," "reserved," "suspended," "established approval," "approved," "disapproved," "acceptable," "unacceptable," "suitable," "accepted," "satisfactory," "unsatisfactory," "sufficient," "insufficient," "rejected," "condemned," or words of like import are used, they shall be understood to imply "by the Engineer" or "to the Engineer," unless the context clearly indicates a different meaning.
32. Indicated - A term meaning as shown on the Contract Drawings, as described in the Specifications, or as required by other Contract Documents.
33. Manager of Contract Administration - the Manager of the Office of Contract Administration for the Massachusetts Bay Transportation Authority or his designee.
34. MBTA Transit System - Authority Transit System, including right-of-way, pavement, tracks, facilities, structures, equipment, appurtenances, and other property of the Authority.
35. Non-System facilities - Facilities which are not a part of the MBTA Transit System.
36. Notice to Bidders - That portion of the Bid which advertises for Bids for a specific Contract. Notice to Bidders will indicate time and place for submitting and for opening of Bids, location of the Work, a brief description of the Work to be provided, and bid security required.
37. Notice to Proceed - Written notice from the Authority to the Contractor to proceed with the Work.
38. Project - That specific portion of MBTA Transit System indicated in the Contract Documents.
39. Provide - In reference to work to be performed by the Contractor, "provide" means furnish, install, and (as applicable) test complete in place.

40. Reference Utility Standards - Drawings and specifications, published by municipalities, utility companies, and railroads which are included or referenced in the Contract Documents.
41. Specifications - Directions, provisions, and requirements contained in the Contract Specifications.
42. Subcontractor - The individual, firm, partnership, corporation, vendor, supplier, or combination thereof to whom the Contractor, with written approval of the Authority, sublets any part of the contract.
43. Supplementary Conditions - Supplements and additions to the General Conditions.
44. Surety - Corporate body bound with and for the Contractor for the full and complete performance of the Contract and for the payment of all legal debts pertaining to the Work, and who executed the Contract Bonds.
45. U.S. Department of Transportation (DOT) - Secretary of the U.S. Department of Transportation, and other person authorized to perform the functions of that office, including representatives of the Federal Transportation Administration (FTA).
46. Value Engineering - The systematic application of recognized techniques which identify the function of a product or service, and provide the necessary function or service reliably at lower overall cost.
47. Work - All the construction, materials, equipment, and contractual requirements as specified, shown, or indicated in the Contract Documents, including all alterations, amendments, or extensions thereto made by authorized changes.
48. Working Drawings and Shop Drawings - Any supplementary drawings or similar data which the Contractor is required to submit to the Engineer for approval, including but not necessarily limited to erection, falsework, and formwork drawings; dewatering; bending diagrams and bar schedules for reinforcing steel; calculations; and manufacturers' catalog information and data.

PART 2 - SCOPE OF WORK

2.1 INTENT OF THE CONTRACT

- A. Intent of the Contract is to provide for the construction and completion in every detail of the Work. The Contractor shall complete the Work to the satisfaction of the Engineer at the Contract price set forth and agreed upon. Where portions of the Work are described in general terms, but not in complete detail, the best general practice shall be followed. Only materials and workmanship of best standard quality shall be used. The Contractor shall, unless otherwise specified, furnish all labor, superintendence, materials, tools, equipment and incidentals necessary to complete the Work in a proper, thorough, and workmanlike manner.
- B. Work consists of work platforms, toilet room renovations, HPCU Room ventilation, and various other associated items of work.

2.2 CHANGES IN THE WORK

- A.** The Authority reserves the right at any time during the progress of the Work to make alterations to, deviations from, additions, to, and deletions from the Contract Drawings and Specifications. Such changes shall not invalidate the Contract nor release the surety. The Contractor agrees to accept the Work as changed, the same as if it had been a part of the original Contract. Such changes will be authorized in writing by the Engineer. Such changes shall not invalidate the Contract, nor any part thereof.
- B.** Wherever an alteration, deviation, addition, or deletion involves a change in the nature of design or in the type of construction which increases or decreases the cost of performance of the Work or requires the Contractor to furnish materials or provide work of a kind not susceptible of classification for payment under any of the items scheduled in the Bid, the Authority and the Contractor may enter into Supplementary Agreements covering the work to be done and -the manner and method of payment therefor. If the Contractor and the Authority disagree on increased or decreased costs, the changes shall be by a Change Order.
- C.** If the changes, in the opinion of the Engineer, are of sufficient magnitude as to require additional time to complete the Contract, such time adjustment may be made in accordance with the provisions of Article 6.8.

2.3 EXTRA WORK

- A.** The Contractor shall do any work not herein provided for when and as ordered in writing by the Engineer, such written order to contain particular preference to this Article and to designate the work to be done as Extra Work.
- B.** Unless specifically noted in the Change Order, Extra Work will not extend the time of completion of the Contract as stipulated in Article 6.8 A.6.
- C.** Determination of the Engineer will be final upon all questions concerning the amount and value of Extra Work (except as provided in Article 5.19).
- D.** Payment for Extra Work will be as specified in Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM).

2.4 CONTRACTOR COST REDUCTION PROPOSALS VALUE ENGINEERING (APPLICABLE TO CONTRACTS IN EXCESS OF \$200,000)

- A.** The Contractor may submit cost reduction Proposals for changing the Contract requirements. The Proposals shall be based upon a sound study made by the Contractor indicating that the Proposal:
 - 1. Will result in a net reduction in the total Contract cost to the Authority;
 - 2. Will not impair any essential form, fit, function, or characteristic of the Work, such as safety, service life, reliability, economy of operation, ease of maintenance, and necessary standardized features;
 - 3. Will not require an unacceptable extension of the Contract completion time; and
 - 4. Will require a Change Order to the Contract.
- B.** Cost reduction or Value Engineering Proposals shall be processed in the same manner as prescribed for any Contract initiated Proposal which would necessitate issuance of a Change Order. The Contractor shall submit the following information as a minimum, with each Cost reduction Proposal:

1. A description of the difference between the existing Contract requirements and the proposed change, and the comparative advantages and disadvantages of each;
 2. An itemization of the requirements of the Contract which must be changed if the Proposal is adopted and a recommendation as how to make such change (e.g., suggested revision);
 3. An estimate of the reduction in Contract performance costs that will result from adoption of the Proposal, taking into account the cost of implementation by the Contractor (including any amount attributable to subcontracts in accordance with Paragraph E. below and the basis for the estimate).
 4. A statement of the time by which a Change Order must be issued so as to obtain the maximum cost reduction during the remainder of this Contract, noting any effect of the Contract delivery schedule.
- C. The Authority will not be liable for any delay in acting upon, or for failure to act upon, any Value Engineering Proposal submitted pursuant to this Article. The decision of the Authority as to the acceptance of any such Proposal shall be final. The Authority may accept in whole or in part, any Proposal submitted pursuant to this Article by issuing a Change Order. Unless and until a Change Order is issued, the Contractor shall remain obligated to perform in accordance with the terms of the Contract.
- D. If a Value Engineering (cost reduction) Proposal is accepted and applied, an equitable adjustment in the Contract price and in any other affected provisions will be made. The equitable adjustment in the Contract price will be established by determining the total estimated decrease in the Contractor's cost of performance resulting from the accepted changes, taking into account the Contractor's cost of implementing the change (including any amount attributable to subcontracts in accordance with Paragraph E. below). The Contract price shall be reduced by such total estimated decrease in the cost of performance minus 50 percent of the difference between the amount of such total estimated decrease and any ascertainable collateral costs to the Authority which must reasonably be incurred as a result of application of the cost reduction Bid.
- E. The Contractor shall include appropriate value engineering arrangements in any subcontract which, in the judgment of the Contractor, is of such a size and nature as to offer reasonable likelihood of cost reductions. In computing any equitable adjustment in the Contract price under Paragraph D., the Contractor's cost of implementation of a Value Engineering Proposal which is accepted shall include any implementation cost of a Subcontractor and any value engineering incentive payments to a Subcontractor, which clearly pertain to such Proposal and which are incurred, paid or accrued in the performance of a subcontract.
- F. The Contractor may restrict the Authority's right to see any portion of the Contractor's Proposal by marking it with the following requirement:
1. This data, furnished pursuant to Article 2.4 of the General Conditions of **Contract No. R20CN01** may not be duplicated, used or disclosed, in whole or in part, for any purpose except for evaluation, unless the Proposal is accepted by the Authority. This restriction does not limit the Authority's right to use information contained in this data if it is or has been obtained, or is otherwise available, from the Contractor or from another source, without limitations. When this Proposal is accepted by the Authority, the Authority will have the right to duplicate, use, and disclose any data in any manner and for any purpose whatsoever, and have others do so whether under this or any other Authority contract.
- G. Contract modifications made as a result of this Article will state that they are made pursuant to it.

2.5 INCREASED OR DECREASED CONTRACT QUANTITIES

- A. The Contractor shall accept as payment in full, so far as Contract Items are concerned, payment at the original bid contract unit prices for up to 100% of the units in the bid. The Engineer may order

omitted from the work any items or portions of work. Such omissions shall not operate as a waiver of any conditions of the Contract nor invalidate any of the provisions thereof, nor shall the Contractor have any claim for anticipated profit or overhead.

- B. When the accepted quantities of work reach 75% of the quantities in the Bid Form and the Contractor anticipates that known work will require a quantity of units in excess of the units in the bid, the Contractor shall notify the Authority that additional quantities of work will be required, and submit a proposed cost to complete the work in excess of the bid units. If the Authority is in agreement, an Extra Work Order Authorization Letter (EWOAL) will be issued to the Contractor for a not to exceed amount. No payment will be made against a unit price pay item after expenditure of 100% of the quantity in the bid. After 100% of the units in the bid have been expended, the Contractor will proceed on a time and materials basis, or as directed in the EWOAL, until such time as a final lump sum can be negotiated for the extra work scope. Once agreement is reached a Change Order will be issued in accordance with SECTION 01151 – MEASUREMENT AND PAYMENT (LUMP SUM) - SECTION 1.5 – PAYMENT FOR EXTRA WORK.
- C. Except as specified herein, no payment will be made for any increased expenses, loss of expected reimbursement, loss of anticipated profits or loss of overhead absorption, suffered or claimed by the Contractor either directly or indirectly from such increased or decreased quantities or from unbalanced allocation among the Contract Items of overhead expense on the part of the Contractor and subsequent loss of expected reimbursement, or from any other cause.

2.6 RIGHTS IN THE USE OF MATERIALS FOUND ON THE WORK.

- A. Contractor, with prior written approval of the Engineer, may take suitable ledge, gravel, sand, loam, clay, or other material from within the location lines of the Contract and use it on the same Contract for other purposes than for forming embankments. If such use necessitates securing additional material for forming embankments, the Contractor shall replace, at no additional expense to the Authority, material of at least similar quality. The Contractor shall not excavate or remove any material which is not within the excavation as indicated by the Contract Documents without written approval. Excavated material suitable for use shall not be wasted, unless otherwise directed.

2.7 [NOT USED]

2.8 WARRANTY OF WORK

- A. Neither final acceptance, final payment nor any provision in the Contract Documents nor partial or entire use or occupancy of the premises by the Authority shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability with respect to any express warranties or responsibility for faulty materials or workmanship.
- B. Except where longer periods of warranty are specified for certain items, the Contractor warrants all work done under the Contract to be free from faulty materials and workmanship for a period of one year from date of acceptance thereof.
- C. Upon receiving notification from the Authority, the Contractor shall immediately make the required repairs or replacements to any work found defective. If repairs or replacements are not started within 10 days from the date of notification and prosecuted to completion, the Authority reserves the right to employ others to complete the Work. The Contractor agrees, upon demand, to pay the Authority all amounts which it expends for such repairs or replacements.

- D. All remedied Work shall carry the same warranty as the original work starting with the date of acceptable replacement or repair.

2.9 CHANGED CONDITIONS

In accordance with Chapter 30, Section 39N of the General Laws of the Commonwealth, as amended, the following paragraph shall apply to the Contract:

- A. If during the progress of the Work, the Contractor or the Awarding Authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those indicated in the Contract Documents either the Contractor or the Authority may request an equitable adjustment in the Contract price of the Contract applying to work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a Contractor, or upon its own initiative, the Authority will make an investigation of such physical conditions, and, if they differ substantially or materially from those indicated in the Contract Documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents-and are of such a nature as to cause an increase or decrease in the cost of performance of the Work or a change in the construction methods required for the performance of the Work which results in an increase or decrease in the cost of the Work, the Authority will make an equitable adjustment in the Contract price and the Contract will be modified in writing accordingly.
1. Filing, investigation, and settlement of all claims made under said Chapter and Section shall be as follows:
 - a. The Contractor shall promptly and before such conditions are disturbed, notify the Engineer in writing describing in full detail the subsurface or latent physical conditions at the site where it is maintained, that conditions differ substantially or materially from those conditions indicated in the Contract Documents. The Engineer will promptly investigate the conditions and will promptly submit a written report of its findings and determinations to the Contractor, and if it is found that such conditions as have been described in detail by the Contractor do exist and in fact do so differ materially or substantially, an equitable adjustment will be made and the Contract modified in writing accordingly. No such claim of the Contractor will be allowed unless the Contractor has given the detailed notice specified, or shall it be allowed if such conditions are disturbed prior their investigation by the Engineer.
 - b. No adjustment or allowance of any kind except as provided in Article 6.8 will be made to the Contractor due to delay or suspension of the Work or any portion thereof where the actual subsurface or latent physical conditions encountered at the site differ substantially and materially from those indicated in the Contract Documents.
 - c. No claim will be approved and no adjustment or allowance made when encountering subsurface or latent physical conditions at the site that differ substantially and materially from those indicated in the Contract Documents unless such conditions were in existence at the time of the Award of the Contract.
 - d. Any dispute concerning a question of fact under the Subsection which is not disposed of by agreement shall be decided by the engineer.
 - e. If as provided in (a) of this Subsection an equitable adjustment is to be made or contemplated, the Contractor shall submit promptly in writing to the Engineer an itemized statement of the details and amount of work together with his estimated costs for the same and the Engineer shall require the Contractor to keep actual costs and certify the same to the Authority in writing.
- B. If the Contractor and the Authority fail to agree on an equitable adjustment to be made under this Article, then the Contractor shall accept as full payment for the Work in dispute an amount

determined in accordance with Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM).

2.10 CONTRACTOR PROPOSED CHANGES

- A. Contractor may at any time submit to the Engineer for the Engineer's review and approval or denial, proposed changes to the Contract Documents which will benefit the Authority. Upon acceptance of the proposed changes, the provisions of Article 2.2 and 2.4 (as applicable) shall apply. Denial of a proposed change shall neither provide the Contractor with any basis for claim for damages nor release the Contractor from contractual responsibilities.

2.11 COMMUNITY RELATIONS

- A. The Contractor shall establish and maintain a continuing liaison with persons residing or doing business in the vicinity of the Project site, for the purpose of minimizing inconveniences resulting from construction, and shall appoint a representative, acceptable to the Engineer, for community relations. The representative shall have the authority to act directly, or through the Contractor's approved Superintendent, regarding all valid requests or complaints. Information as to their disposition by the Contractor, shall be furnished to the Engineer. The name and telephone number of the Contractor's community relations representative shall be furnished to those residents or businessmen in the community who might reasonably be expected to be affected by the construction.

PART 3 - CONTROL OF WORK

3.1 AUTHORITY OF THE ENGINEER

- A. The Engineer will decide all questions relating to interpretation of the Contract Documents, and may alter, adjust, and approve same when necessary; all questions relating to quality, quantity, value, and acceptability of materials to be furnished and work provided or to be provided; all questions relating to progress of the Work and need for and manner of correcting same, and also the need for and terms of delays and suspensions; all questions relating to the need for and terms of Extra work; all questions relating to the supervision, control and direction of Work on the site and the use thereof; and all questions as to the acceptable fulfillment of the Contract by the Contractor.
- B. Attention of the Contractor is directed to the following limitations on the scope of the duties entrusted to the Engineer.
 - 1. The Regulations of the Authority's Board of Directors state that the General Manager is authorized to approve, without prior authorization of the Board, issuance of Change Orders or Extra Work Orders, pursuant to any Agreement previously authorized by the Board or the General Manager, in a total amount not exceeding 7% or \$15,000,000.00 above the contract price of such Agreement, whichever is greater; provided that if the issuance of any such Change Order or Extra Work Order would result in exceeding said 7% or \$5,000,000.00 limitation or if the issuance of any one such Change Order or Extra Work Order would require an expenditure by the Authority of an amount exceeding \$5,000,000.00, it shall not be issued without prior authorization of the Board.
 - 2. The General Manager, as provided by the Regulations of the Board of Directors, has delegated to the Assistant General Manager for Design and Construction the power to approve, without prior authorization of the General Manager or the Board, the issuance of Change Orders or

Extra Work Orders, pursuant to any agreement previously authorized by the Board or the General Manager, in a total amount not exceeding 7% or \$500,000.00 above the contract price of such agreement, whichever is greater; provided that if the issuance of any such Change Order or Extra Work Order would result in exceeding said 7% or \$500,000.00 limitation or if the issuance of any one such Change Order or Extra Work Order would require an expenditure by the Authority of an amount exceeding \$500,000.00, it shall not be issued without prior authorization.

3. The General Manager, as provided by the Regulations of the Board of Directors, has delegated to the Chief Engineer for Design and Construction, and Senior Directors, the power to approve, without prior authorization of the General Manager or the Board, the issuance of Change Orders or Extra Work Orders, pursuant to any agreement previously authorized by the Board or the General Manager, in a total amount not exceeding 7% or \$250,000.00 above the contract price of such agreement, whichever is greater; provided that if the issuance of any such Change Order or Extra Work Order would result in exceeding said 7% or \$250,000.00 limitation or if the issuance of any one such Change Order or Extra Work Order would require an expenditure by the Authority of an amount exceeding \$250,000.00, it shall not be issued without prior authorization.
4. The General Manager, as provided by the Regulations of the Board of Directors, has delegated to the Directors of Design and Construction, the power to approve, without prior authorization of the General Manager or the Board, the issuance of Change Orders or Extra Work Orders, pursuant to any Contract or other Agreement previously authorized by the Board or the General Manager, in a total amount not exceeding 7% or \$100,000.00 above the contract price of such agreement, whichever is greater; provided that if the issuance of any such Change Order or Extra Work Order would result in exceeding said 7% or \$25,000.00 limitation or if the issuance of any such Change Order or Extra Work Order would require an expenditure by the Authority of an amount exceeding \$100,000.00, it shall not be issued, without prior authorization.
5. Employees of the Authority are not authorized to request work to be performed or service to be provided other than as specified above. The Authority will not accept any responsibility whatsoever for extra work performed for which there is no specific proper authorization.

3.2 CONTRACT DRAWINGS

- A. Contract Drawings showing the general arrangement and such details as necessary to give a comprehensive idea of the construction contemplated will be furnished by the Authority. As work progresses, the Contract Drawings may be supplemented by the Engineer as required to amplify or control the work. The Contractor shall perform the work required by such supplements without additional compensation, except as provided by the Contract.

3.3 CONFORMITY WITH DRAWINGS AND SPECIFICATIONS

- A. Attention is directed to Chapter 30, Section 391 of the General Laws of the Commonwealth which provides that no willful and substantial deviation from Contract Drawings and Specifications shall be made unless directed in writing by the Engineer duly authorized by the Authority to approve such deviation. Chapter 30, Section 391 further provides that in order to avoid delays in the prosecution of the Work, such deviation may be authorized by a written order of the Engineer authorized to approve such deviation, and that within 30 days thereafter such -written order shall be confirmed by a certificate of the Authority.
- B. All work provided and all materials furnished shall be in conformity with the lines, grades, cross sections, dimensions, details, gradations, physical, and chemical characteristics of materials and

other specific requirements of the Contract. Where the terms "in conformity with" "in agreement with" "in compliance with" or terms of like exactness occur in the Contract Documents, they shall be understood to imply "in reasonable close conformity with".

- C. Where definite tolerances are specified in the Contract, such tolerances shall fix the limits of conformity. Where tolerances are not specified in the Contract, the Engineer will determine the limits of conformity in each individual case and such determination shall be final and conclusive and mutually accepted by all parties.
- D. If materials or the finished product in which the materials are used are not within conformity with the Contract Documents, but acceptable work has been produced, the Engineer will make a determination whether the work shall be accepted and remain in place. The Engineer will document the basis of acceptance by Contract modification which will provide for an appropriate adjustment in the Contract price for such work or materials as he deems necessary to conform to his determination based on engineering judgment, and in accordance with current construction practices.
- E. If the Engineer finds the materials, or the finished product in which the materials are used or the work provided, are not in conformity with the Contract Documents and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected by the Contractor and at no additional expense to the Authority.
- F. Deviations from the Contract Drawings and approved Shop or Working drawings, that may be required by the need of the construction, will be determined by the Engineer and authorized by him in writing.

3.4 COORDINATION OF CONTRACT DRAWINGS, CONTRACT SPECIFICATIONS, AND STANDARD SPECIFICATIONS

- A. Contract Drawings (including Authority Standards as may be referenced therein), Contract Specifications, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as finding as though occurring in all. They are intended to be complementary and to describe and provide for a complete Work. In the event of any discrepancy between a Drawing and figures written thereon, the figures, unless obviously incorrect, are to govern over scaled dimensions. Contract Drawings will govern over Contract Specifications. Where work is to be accepted by a municipality, railroad, or utility company, the Reference Utility Standards which apply to their materials and workmanship will govern.
- B. The Contractor shall take no advantage of any apparent error or omission in the Contract Documents. If the Contractor discovers, such an error or omission, the Engineer shall be notified immediately. The Engineer will then make such corrections and interpretations as may be deemed necessary to fulfill the intent of the Contract.

3.5 COOPERATION BY CONTRACTOR

- A. The Contractor will be given three copies of the Contract Documents. The Contractor may request and the Authority may approve furnishing additional copies of Contract Drawings, either full or half-size. The Contractor shall have one copy of The Contract Documents on the work site and available for reference at all times during the prosecution of the Work.
- B. Prior to starting Work the Contractor shall designate in writing the name, title, qualifications, and experience of his proposed representative who, upon approval by the Engineer, shall have complete authority to represent and to act for the Contractor. A facsimile of the authorized representative's

signature shall be furnished to the Engineer. The authorized representative or a substitute acceptable to the Engineer shall be present at the work site at all times while work is actually in progress on the Project. Arrangements for responsible supervision acceptable to the Engineer shall be made for emergency work which may be required during periods when Work is suspended. The Contractor shall notify the Engineer, in writing, of any proposed change of his representative, and shall provide identical information for approval of the new representative.

- C. The Contractor shall ascertain that the materials and workmanship are in accordance with the Contract Documents. The Contractor shall preserve baseline monuments, benchmarks, and other controls for the Work.
- D. The Contractor shall carry on his work under the direction of the Engineer such that representatives of Utility Owners, State, or Municipal Departments may enter on the work site without interference to make changes in their facilities which may be affected by the Work. The Contractor shall have no claim for, or use of any delay which may be due to or result from work of Utility Owners, State or Municipal Departments. No allowance of any kind will be made except as provided in Article 6.8. Nothing contained herein shall be construed to hold the Contractor responsible for any acts or omissions by such Utility Owners, State or Municipal Departments, or their contractors.
- E. The Contractor is responsible for providing two (2) week look ahead schedules, submittal logs, RFI logs and issue logs at each bi-weekly meetings. At a minimum, the topics discussed at each bi-weekly meeting shall include safety issues, status of RFI's, submittals and change orders, outstanding non-conformance reports, issues involving operations, community and/or a municipality, old and new business. The Contractor is responsible for maintaining up to date schedules at all times as the schedule is the basis for payment. The Contractor is responsible for attendance and participation in pre-construction and progress meetings with the MBTA. These meetings address all project issues including safety and schedule. The Contractor may be responsible to attend additional special meetings that may be necessary to resolve issues of an immediate or short term nature that cannot wait until the regularly scheduled progress meetings.

3.6 ADJACENT CONTRACTS

- A. The Authority reserves the right at any time to contract for and perform other or additional work on or near the Work covered by the Contract. The intent of this Article is to provide for the cooperation of contractors where the Authority deems it expedient or necessary and in the best interest of the Authority to let separate contracts for the performance of other work on or near the location of the Work being performed under the Contract, but it is not intended to indicate an intention on the part of the Authority to let separate contracts for work within the scope of or necessary for the successful completion of the Contract.
- B. When separate contracts are let within the limits of any one project (either prior to Award of Contract, as specified in the Bid, or as specified above), each contractor shall conduct their work so as not to interfere with or hinder the progress or completion of the work being performed by other contractors. Contractors working on the same project shall cooperate with each other as directed.
- C. Each contractor involved shall assume all liability, financial or otherwise, in connection with its contract and shall protect and save harmless the Authority from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced because of the presence and operations of other contractors working within the limits of the same project. No allowance of any kind will be made except as provided in Article 6.8.
- D. The Contractor shall arrange the work and shall place and dispose of the materials being used so as not to interfere with the operations of other contractors within the limits of the same Project. The

Contractor shall join the work with that of others in an acceptable manner and perform the work in proper sequence to that of others.

3.7 LINE AND GRADE

- A. The Authority will establish primary control for the Work, both horizontal and vertical. The Authority will provide the Contract or Project centerline and such benchmarks and basic tie-in points on or near construction site as in its judgment are necessary for the proper control of the Work. Monuments, stakes, and marks set by the Authority shall be preserved by the Contractor. If such monuments, stakes, or marks are destroyed or damaged, they may be replaced by the Authority. The Contractor will be charged the cost of replacing monuments, stakes, or marks destroyed or damaged by reason of his operations. The replacement cost will be deducted from payment for the Work.
- B. The Contractor shall proceed from the controls established by the Authority to make all surveys and layouts necessary to conform all of the work to the requirements of the Contract Documents; shall provide qualified engineering and other personnel for the purpose; and shall be solely responsible for the accuracy of the line and grade features of his Work.
- C. The Authority will make such checks, as necessary, of the control work established by the Contractor as the Work progresses. The Contractor will be informed of results of such checks but the Authority by so doing will in no way relieve the Contractor of responsibility for accuracy of the Contract control. The Contractor shall provide such assistance as may be required for checking purposes when requested by the Authority.
- D. The Contractor shall notify the Authority a reasonable time in advance of his needs, of the time and place the Contractor plans to provide the Work for which such primary control will be needed. The Authority will furnish the Contractor with such primary lines, grades, and elevations as it deems necessary by such time so as not to delay the Contractor's operations. The Authority, however, will not be held responsible for any delay resulting from lack of such information if the Contractor fails to notify the Authority sufficiently in advance of the Contractor's needs.

3.8 AUTHORITY AND DUTIES OF ENGINEER'S ASSISTANTS

- A. The Engineer may appoint assistants and representatives. The assistants and representatives are authorized to inspect work and materials, to give directions pertaining to the Work or to the safety and convenience of the public, to approve or reject materials and to make measurements of quantities.
- B. In case of any dispute arising between the Contractor and the Engineer's assistants, as to materials furnished or the manner of providing work, the Engineer's assistants are authorized to reject materials or to suspend work until the dispute is referred to and decided by the Engineer.
- C. The Engineer's assistants are not authorized to revoke, alter, enlarge, relax, or release any requirements of these Specifications nor to issue instructions contrary to the Contract Drawings and Specifications.
- D. The Engineer's assistants will not act as foremen or perform other duties for the Contractor.

3.9 INSPECTION OF WORK

- A.** All materials and each part or detail of the Work shall be subject to inspection by the Engineer. The Engineer shall at all times have access to the Work and be furnished with information and assistance by the Contractor as required to make a complete and detailed inspection.
- B.** The Contractor, if requested by the Engineer, shall before acceptance of the Work, remove or uncover such portions of the finished Work as directed. After examination, the Contractor shall restore said work to the standard required by the Contract Documents. Should Work exposed or examined prove accessible, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as Extra Work. Should Work exposed or examined prove unacceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed, will be at no additional expense to the Authority.
- C.** Any Work done or materials used without authorization by the Engineer may be ordered removed and replaced at no additional expense to the Authority.
- D.** The Contractor shall furnish written information to the Engineer stating the original sources of supply of all materials manufactured away from the Work site. This information shall be furnished at least two weeks (or as otherwise required by the Engineer) in advance of the incorporation in the Work of such materials.
- E.** When any unit of government or critical subdivision is to pay a portion of the Cost of the Work, its respective representatives shall have the right to inspect the Work. Such inspection shall in no sense make any unit of government or political subdivision a party to this Contract, and shall in no way interfere with the rights of either party hereunder.
- F.** Inspection of Work shall not relieve the Contractor of any of his obligations to fulfill the requirements of the Contract Documents.
- G.** Failure to reject any defective Work or materials shall not in any way prevent later rejection when such defect is discovered, nor obligate the Authority to make final acceptance.
- H.** The Contractor shall give prior notice to the Engineer when Work on the various items is to be performed by him or his subcontractors. If Work is suspended on any item, prior notice shall be given to the Engineer before resumption of such Work. Except in the case of an unforeseen emergency, neither the Contractor nor any subcontractor shall perform any Work requiring inspection at hours other than during the normal workday without prior approval of the Engineer.

3.10 REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK

- A.** Defective Work shall be promptly remedied, or removed and replaced, notwithstanding that such Work has previously been inspected and approved or estimated for payment. If the Work or any part thereof shall be found defective at any time, the Contractor shall, at no additional expense to the Authority, make good such defect in a satisfactory manner.
- B.** Work performed beyond the lines and grades shown on the Contract Drawings or established by the Engineer, and extra Work done without written authorization, will be considered unauthorized Work and the Contractor will receive no compensation therefor. If required by the Engineer, unauthorized work shall be remedied, removed, or replaced at no additional expense to the Authority.
- C.** Upon failure of the Contractor to remedy, remove, or replace defective or unauthorized Work, or to comply promptly with any requirement of the engineer made under this Article 3.10, the Authority

may cause defective or unauthorized Work to be remedied, removed, or replaced by others and deduct the costs thereof from any monies due or to become due to the Contractor.

3.11 FINAL ACCEPTANCE (ALSO SEE ARTICLE 5.24)

- A. Upon substantial completion of the Work, the Contractor shall present, in writing, to the Authority its certification that the Work has been substantially completed. Within 21 days thereafter, the Authority as a result of its inspection of the Work will present to the Contractor either a written declaration that the Work has been substantially completed or an itemized list of incomplete or unsatisfactory Work items required by the Contract sufficient to demonstrate that the Work has not been substantially completed. The Authority may include with such list a notice setting forth a reasonable time, which shall not in any event be prior to the Contract completion date, within which the Contractor must achieve substantial completion of the Work. If the Authority fails to respond, by presentation of a written declaration or itemized list as aforesaid, to the Contractor's certification within the 21-day period, the Contractor's certification shall take effect as the Authority's declaration that the Work has been substantially completed.
- B. If the Work or any part thereof is not acceptable to the Engineer at the time of the inspection, the Contractor will be notified in writing of the particular defects or parts to be remedied before final acceptance. If the Contractor has not arranged within a period of five days after the date of transmittal of such notice of nonacceptability, to complete the Work as directed by the Engineer, the Authority may, without further notice and without in any way affecting the Contract, make such other arrangements as may be considered necessary to insure satisfactory completion of the Contract. The cost of completing such Work will be deducted from any moneys due or which may become due to the Contractor under the Contract.
- C. Substantial completion, for the purposes of this Article, shall mean either that the Work required by the Contract has been completed except for Work having a Contract price of less than one percent of the then adjusted total contract price, or substantially all of the Work has been completed and opened to public use except for minor incomplete or unsatisfactory Work items that do not materially impair the usefulness of the Work required by the Contract.

 - 1. See Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM), for Final Acceptance and Final Payment.

PART 4 - CONTROL OF MATERIALS

4.1 TRADE NAMES AND ALTERNATIVES

- A. An item equal to that named or described in the specifications may be furnished by the Contractor, and the naming of any commercial name, trademark, or other identification shall not be construed to exclude any item or manufacturer not mentioned by name or as limiting competition, but shall establish a standard of equality only. An item will be considered equal to the item so named or described if:

 - 1. it is at least equal in quality, durability, appearance, strength, safety, reliability, operability, maintainability, and design;
 - 2. it will perform at least equally the function imposed by the general design for the Work being contracted for; and
 - 3. it conforms substantially, even with deviations to the detailed requirements for the item specified.

- B. For each item of material the specifications shall provide for either a minimum of three brands of material or a description of material which can be met by a minimum of three manufacturers or producers and for the equal of any one of said named or described materials.
- C. Burden of proof as to the quality and suitability of alternatives shall be upon the Contractor. The Contractor shall furnish, in writing, all information necessary as required by the Engineer at no additional cost to the Authority. Requests for review of alternative materials will not be accepted by the Engineer from anyone other than the Contractor. The Engineer will be the sole judge as to the quality and suitability of alternative materials and the Engineer's decision will be final.
- D. Information furnished shall state whether or not acceptance of the alternative material for use in the Work will require a change in the Contract Drawings or Specifications to adapt the design to the alternative and whether or not incorporation or use of the alternative in connection with the Work is subject to payment of any license fee or royalty. The Authority does not pay license fees or royalties. Where use of an alternative material involves redesign of or changes to other parts of the Work, the cost and the time required to effect such redesign or changes will be considered in evaluating the suitability of the alternative material and the Contractor shall pay charges incurred by the Authority for such redesign or change.
- E. No tests nor action relating to the approval of alternative materials will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the equality of the materials proposed. Such request shall be made in ample time to permit approval without delaying the Work, but such requests need not be made less than 30 days after receipt of Notice to Proceed.
- F. Whenever classification, rating, or other certification by a body, such as UL, NEMA, or AREA, is a part of the specification for any material, proposals for use of alternative materials shall be accompanied by reports from the listed or equivalent independent testing laboratory indicating compliance with specification requirements.
- G. The Contractor shall pay costs of testing required to prove equality of the material proposed.
- H. Approval of an alternative material shall be only for the characteristics or use named in such approval, and shall not be used to change or modify any Contract requirement, or to establish a basis for subsequent approval for material to be used on any other phase of the Work of the Massachusetts Bay Transportation Authority Transit System.

4.2 CERTIFICATES OF COMPLIANCE

- A. The use of certain materials on the basis of a notarized certificate of compliance may be allowed under the following conditions: Before such materials are incorporated into the Work, the Contractor shall submit to the Engineer, for approval, copies of the manufacturer's or supplier's statement for each kind of such material furnished. The statement shall contain the following information:
 - 1. Contract to which the material is consigned;
 - 2. Name of the Contractor to which the material is supplied;
 - 3. Kind of material supplied;
 - 4. Quantity of material represented by the certificate;
 - 5. Means of identifying the consignment, such as label, marking, seal number, etc.;
 - 6. Date and method of shipment;
 - 7. Statement to the effect that the material has been tested and found in conformity with the pertinent parts of the Contract;

8. Results of all required tests including the chemical analysis in the case of metal; or in lieu of furnishing the results a statement that the results of all required tests pertinent to the certificate and not submitted shall be maintained available by the undersigned for a period of not less than 3 years from date of final acceptance;
 9. Signature of a person having legal authority to bind the supplier.
- B.** If the Contractor has new materials purchased for use on a previous Authority contract which have never been used and which comply with the Contract Documents, these materials may be furnished and installed in the Work provided the Contractor submits his own sworn statement certifying that such materials were purchased for use on a previous contract (name and identifying such contract) and that certificates of compliance were furnished for such materials on the previous contract, to which reference can be made.
1. Costs involved in furnishing the certificates shall be borne by the Contractor.
 2. Materials used on the basis of a certificate of compliance may be sample and tested at any time. The fact that material is used on the basis of a certificate of compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents and Specifications and any such material not conforming to such requirements will be subject to rejection, whether in place or not.
 3. The Engineer reserves the right to refuse to permit the use of materials on the basis of a certificate of compliance alone.
- C.** Certification of specification compliance shall be furnished for all materials and installation of the same as specified throughout the construction specifications. (See sample Certificate of Compliance included on page 51 of this Section 00700 – GENERAL CONDITIONS.)

4.3 AUTHORITY-FURNISHED MATERIALS

- A.** Materials furnished by the Authority will be available at locations designated in Supplementary Conditions of the Contract Specifications or, if not so designated, they will be delivered to the Work site. Authority-furnished materials shall be stored and transported to the place of use by the Contractor at his expense, including all necessary loading and unloading. The Contractor's costs of storing, handling, and installing Authority furnished material shall be considered as included in the Contract price paid for the Item involving such Authority-furnished material.
- B.** Contractor shall be responsible for all materials furnished to him, and shall pay all demurrage and storage charges as a result of his failure to take delivery of Authority-furnished material. The Contractor shall be liable to the Authority for the cost of replacing or repairing Authority-furnished material lost or damaged from any cause whatsoever after receipt by the Contractor. The costs will be deducted from any moneys due or to become due the Contractor, except those amounts when covered under any claims' payments made under insurance policies furnished by the Authority.

4.4 DEFECTIVE MATERIALS

- A.** Contractor furnished materials not conforming to the requirements of the Contract Documents will be rejected, whether in place or not. Rejected material shall be removed immediately from the site of the Work unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the Work unless approved in writing by the Engineer. If the Contractor fails to comply promptly with a request by the Engineer, made under the provisions of this Article, the Engineer may cause the removal and replacement of rejected material and the cost thereof will be deducted from any moneys due or to become due the Contractor.

4.5 ASBESTOS MATERIALS

- A. Contractor shall not furnish or install asbestos or any material containing asbestos under this Contract.

4.6 BANNED MATERIALS

- A. Lead Paints: Contractor shall not furnish or install lead containing paint on any surfaces within the limits of this Contract. A lead containing paint is defined by the Consumer Product Safety Commission's Paint Poisoning Prevention Act of 1979 as any coating whose dried film contains greater than 0.06% by weight of lead.

PART 5 - LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

5.1 LAWS TO BE OBSERVED

- A. The Contractor shall keep fully informed concerning all requirements of law, including all state and federal laws, county and municipal ordinances, and regulations which in any manner affect those engaged or employed in the Work, or the materials used in the Work, or such orders and decrees of bodies or tribunals having jurisdiction or authority over the same. The Contractor shall protect, indemnify and hold harmless the Authority and the Engineer, and all of their officers, agents, and employees against all claims and liabilities arising from or based on the violation of any such requirement of law whether by the Contractor, his employees, agents, or subcontractors. If any discrepancy or inconsistency is discovered in the Contract Documents in relation to any such requirements of law, the Contractor shall immediately report the facts to the Engineer in writing. The Contract shall be governed by the laws of the Commonwealth.
- B. The Contractor, if a foreign corporation (a corporation established, organized, or chartered under laws other than those of the Commonwealth) shall comply with the provisions of Chapter 181 of the General Laws as amended. The Contractor shall file with the Authority a certificate of the State Secretary stating that such corporation has complied with Chapter 181 and the date of such compliance.
- C. Other out-of-state business organizations, such as individual proprietorship, partnership, and joint ventures, shall appoint an agent in this Commonwealth for the service of legal process and furnish a copy of such appointment to the State Secretary prior to the issuance of a contract by the Authority.
- D. Work shall be in accordance with the Massachusetts State Building Code.
 - 1. The Contractor shall protect and indemnify the Authority and its representatives against any claim or liability arising from or based on the violation of any law, ordinance, safety code, regulation, order or decree whether caused by the Contractor, its employees or its subcontractors employed on the Project.
 - 2. Such laws, ordinances, codes, regulations, orders, or decrees may restrict and limit the Contractor's working hours or use of certain types of equipment on the Project. The Contractor shall become familiar with such restrictions and limitations prior to submitting a Bid.
 - 3. The Contractor shall give all necessary notices, obtain all permits as required and pay all government taxes, fees, and other costs in connection with the Work. The Contractor shall file all necessary drawings, prepare all documents, and obtain all necessary approvals of all governmental departments which have jurisdiction. The Contractor shall obtain all required Certificates of Inspection prior to acceptance and final payment for the Work. Compensation

for conforming to all provisions of this Article 5.1, except as may be provided otherwise in Supplementary Conditions, shall be considered as included in the Contract price and no additional compensation will be allowed therefor.

- E. Without limiting the Contractor's responsibility for ascertaining and complying with all applicable laws, ordinances, regulations, orders, and decrees, the Contractor's attention is called particularly to Division 1, General Requirements, Section 01560 – TEMPORARY CONTROLS.

5.2 PERMITS AND LICENSES

- A. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes and give all notice necessary and incidental to the due and lawful prosecution of the Work.

5.3 MOTOR VEHICLES

- A. Motor vehicles (except vehicles used solely for transporting employees to and from the Contract location) used wholly or in part within the Commonwealth by the Contractor or a subcontractor, or by a person directly or indirectly employed by them in the execution of the Contract, shall be registered in the Commonwealth and bear Massachusetts registration plates.
- B. Motor vehicles used solely for transporting employees to and from the Contract location shall be registered as required under General Laws, Chapter 90, Section 3, of the Commonwealth, as amended.
- C. A vehicle shall not be driven on any way, as defined in Section I of Chapter 90 of the General laws of the Commonwealth, unless it is constructed or loaded so as to prevent any of its load from dropping, shifting, leaking, or otherwise escaping therefrom, except that sand may be dropped for the purpose of securing traction, or water or other substance may be sprinkled on such a way in cleaning or maintaining the same. (General Laws, Chapter 85, Section 30, of the Commonwealth as amended.)
- D. All Diesel Construction Equipment must have emission control devices installed, such as oxidation catalysis or particulate filters on the exhaust system side of the diesel combustion engine equipment.

5.4 INSURANCE REQUIREMENTS

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- A. The Contractor shall carry Commercial General Liability Insurance for personal injury, bodily injury and property damage with limits not less than \$1,000,000 per occurrence, \$1,000,000 aggregate covering all work performed under this Contract. The insurance should include the following:
 - 1. All operations.
 - 2. Contractual liability.
 - 3. Coverage for the so-called "X, C, U" hazards, i.e., collapse of building, blasting, and damage to underground property.
 - 4. Completed operations hazard for a period of at least two years following acceptance by the Authority of the completed Contract.
 - 5. Use of watercraft, aircraft when applicable.
- B. Pollution Liability Insurance

1. The Contractor or his designated Subcontractor shall carry Pollution Liability in an amount not less than \$1,000,000 per occurrence and \$5,000,000 aggregate, for sudden and gradual occurrences arising out of the work being performed under this Contract including, but not limited to, all hazardous material identified under this Contract.
 2. The Contractor shall designate the disposal site and furnish a Certificate of Insurance from the Disposal Facility for Environmental Impairment Liability insurance covering liability for sudden and accidental occurrences in the amount of not less than \$3,000,000 per occurrence and \$6,000,000 aggregate and shall also include liability for non sudden occurrences in the amount of not less than \$5,000,000 per occurrence and \$10,000,000 aggregate.
 3. The Contractor shall designate the hauler and furnish a Certificate of Insurance from the hauler for Automobile Liability insurance with endorsement MCS90 for the liability arising out of the transportation of hazardous material with an amount not less than \$5,000,000 annual aggregate.
 4. Certificates of Insurance shall clearly state the hazardous materials exposure identified under the contract.
- C. Automobile Liability Insurance - including the use of all vehicles; owned, leased, hired and non-owned, with limits not less than \$1,000,000 combined single limit covering all work performed under the Contract.
- D. [NOT USED]
- E. The Contractor shall carry Worker's Compensation Insurance, including Employers Liability Insurance as provided by Massachusetts General Laws, Chapter 152, as amended, covering all work performed by him under the Contract.
- F. The Contractor shall carry Umbrella Liability Coverage with limits of not less than \$10,000,000 per occurrence, covering all work performed by him under this Contract.
- G. The Contractor shall carry Builder's Risk Insurance (All Risks' form) on a 100 percent completed value basis for the full insurable portion of such Work for the benefit of the Authority, the Contractor and all Subcontractors.
- H. The required insurance coverages hereinbefore specified shall be placed with insurance companies licensed by the Massachusetts Division of Insurance to do business in the Commonwealth of Massachusetts and having a Best's rating of B+ or better, shall be taken out before the Contract is commenced and be kept in full force and effect throughout the term of the Contract, shall be primary to and non-contributory to any insurance or self-insurance maintained by the MBTA, and shall require that the MBTA be given at least 30 days advance written notice in the event of any cancellation or materially adverse change in coverage. All such required insurance, with the possible exception of Pollution Liability Insurance, shall be written on an occurrence basis form, as opposed to a claim made basis form. The MBTA shall be named as an additional insured under the Commercial General Liability, Automobile Liability, Umbrella, Pollution Liability, and Builder's Risk Insurance Policies. The Workers' Compensation and Employers' Liability Insurance Policies shall include a waiver of subrogation in favor of the MBTA which precludes these insurers from being able to make any subrogation claims against the MBTA. All such required insurance shall not contain any exclusions for acts of terrorism, and shall fully cover any acts of terrorism, irrespective of whether such acts of terrorism are caused by domestic or foreign terrorists, and irrespective of whether such acts of terrorism are certified or non-certified by the Secretary of the Treasury, in concurrence with the Secretary of State and the Attorney General of the United States, to be an act of terrorism pursuant to the federal Terrorism Risk Insurance Act of 2002. All such insurance as is required of the Contractor shall be provided by or on behalf of all subcontractors to cover their operations performed. The Contractor shall be held responsible for any modifications, deviations or omissions in the compliance with these requirements by the subcontractors. At the inception date

of the Contract and throughout the term of the Contract, the MBTA shall be provided with certificates of insurance evidencing that such insurance policies are in place and provide coverage as required. The following statement affirming that coverage completely complies with contract requirements shall be included in the special items section of the certificate or in an attached special items addendum page:

The aforementioned insurance coverages completely comply with Article 5.4 Insurance Requirements Paragraphs A - I of MBTA Contract No. R20CN01.

- I. In the event it is determined during excavation or construction that an asbestos condition does exist, a Licensed Asbestos Specialist shall be employed by the Contractor to perform the asbestos containment and abatement work. Prior to asbestos containment and abatement work, the Contractor shall, through the Licensed Asbestos Specialists, obtain insurance in amounts and types specified by the Authority, naming the MBTA as an additional insured as its interest appears under this Contract. Payment for this work will be made in accordance with Division 1 - General Requirements, Section 01151, Article 1.5. PAYMENT FOR EXTRA WORK.

5.5 PATENTED DEVICES, MATERIALS, AND PROCESSES

- A. The Contractor shall indemnify and save harmless the Authority and all persons acting for or on behalf of the Authority from all claims and liability of any nature or kind, and all damages, costs and expenses, including attorney's fees, arising from or occasioned by an infringement or alleged infringement of any patents or patent rights on any invention, process, material, equipment, article, or apparatus, or any part thereof, furnished and installed by the Contractor, or arising from or occasioned by the use of manufacture thereof, including their use by the Authority. In case such materials, equipment, devices, or processes are held to constitute an infringement and their use enjoined, the Contractor, at his expense, shall:
1. Secure for the Authority the right to continue using said materials, equipment, devices, or processes by suspension of the injunction or by procuring a license or licenses; or
 2. Replace such materials, equipment, devices, or processes with noninfringing materials, equipment, devices, or processes; or
 3. Modify them so that they become noninfringing, or remove the enjoined materials, equipment, devices, or processes and refund the sums paid therefor without prejudice to any other rights of the Authority or the Engineer.
- B. When Federal Funds are involved, patent rights to any patentable result arising out of the Work, as well as all information, designs, specifications, know-how, data, and findings, shall be made available to the Government for public use, unless the Federal Department involved shall, in specific cases where it is legally permissible, determine that it is in the public interest that it not be so made available.

5.6 RESTORATION OF SURFACES OPENED BY PERMIT

- A. Contractor shall not allow any party to make an opening in a street or highway for any purpose except upon the direction of the Engineer and the presentation of a duly authorized permit or other instrument. The holder of such a permit or instrument shall be considered in the same class as a contractor on an adjacent contract, and the provisions of Articles 3.5 and 3.6 shall apply.

5.7 FEDERAL PARTICIPATION

- A. Attention is directed to the provisions of the Federal Transportation Act of 1964 (U.S. Public Law 88-365), as modified or amended, and any other provisions of law, or amendments thereto whereby such federal participation is authorized, and any regulations properly and lawfully promulgated thereunder, under which the United States shall aid the individual states in the development of efficient and coordinated mass transportation systems. When the United States government is to pay any portion of the cost of the Contract, the above act of Congress provides that the construction work and labor in each State shall be done in accordance with the laws of that State and applicable federal laws. The Work embraced in the Contract will, therefore, be subject to such inspection by representatives of the U.S. Department of Transportation or other such Federal Agency as may be necessary to meet the above requirements. Such inspection shall, however, in no sense make the United States government a party to the Contract, and will in no way interfere with the rights of either party hereunder.

5.8 [NOT USED]

5.9 [NOT USED]

5.10 PROTECTION AND RESTORATION OF PROPERTY

- A. The Contractor shall, at no additional expense to the Authority, preserve and protect from injury all property either public or private along and adjacent to the proposed Work. The Contractor shall be responsible for and shall repair at no additional expense to the Authority any and all damage and injury thereto, arising out of or in consequence of any act or omission, neglect or misconduct in the execution of the Work, or in consequence of the nonexecution thereof by the Contractor or his employees or subcontractors in the performance of the Work covered by the Contract prior to completion and acceptance thereof. The Contractor shall be solely responsible for any trespass upon adjacent property or injury thereto, resulting from or in connection with his operations. The Contractor shall be liable for any claims that may be made on account of the felling of trees or the deposit of debris of any kind upon private property. Special care shall be exercised during blasting operations to avoid injury to underground structures and utilities.
- B. Written notice shall be given by the Contractor to all public service corporations or officials owning or having charge of public or private utilities of his intention to commence operations affecting such utilities at least five days, exclusive of Saturdays, Sundays, and legal holidays in advance of the start of such operations in accordance with Chapter 82, Section 40 of the General Laws of the Commonwealth, as amended. The Contractor shall, at the same time, file a copy of said notice with the Engineer.
- C. Although the Contract Drawings may indicate the approximate location of existing subsurface utilities in the vicinity of the Work, accuracy and completeness of the information is not guaranteed by the Authority. Before commencing any work or operations which may endanger or damage subsurface structures, the Contractor shall carefully locate all such structures and conduct his operations in such manner as to avoid damage thereto. When necessary, the Contractor shall cooperate with representatives of public service and utility companies in order to avoid damage to their structures by furnishing and erecting suitable supports, props, shoring, or other means of protection. The Contractor shall not interrupt live services until new services have been provided. All abandoned services shall be plugged or otherwise made safe and secure. Compensation for conforming to all provisions of this Article 5.10, unless compensation is authorized in writing by the Engineer, as specified in Article 2.3, Extra Work, or as may be Conditions, shall be considered

as included in the lump sum price of the Contract and no additional compensation will be allowed therefor.

- D. If the Contractor desires to temporarily relocate a utility, other than those contemplated by the Authority, he shall make the necessary arrangement with the appropriate utility company and make reimbursement for the cost thereof at no additional expense to the Authority.
- E. Access to fire hydrants and fire alarm boxes shall be maintained by the Contractor throughout the prosecution of the Work. Hydrants, alarm boxes, and standpipe connections shall be kept clear of obstructions and kept visible at all times. If visibility cannot be maintained, the Contractor shall provide clearly visible signs and lights showing the locations of fire hydrants, fire alarm boxes, or standpipe connections. Utility companies and municipal agencies having facilities within the limits of the Work shall have access to their facilities at all times for inspection and repair.
- F. Land monuments and property marks shall be carefully protected by the Contractor and if necessary to remove the same, he shall do so only at the Engineer's direction and after an authorized agent has witnessed or otherwise referenced their location.
- G. The Contractor shall protect and preserve natural surroundings and roadside growth either within or adjacent to the project site from damage or injury due to these operations. The Contractor shall not, except by written permission of the Engineer, remove, destroy, or trim roadside trees or shrubs. Trees or landscape features carelessly scarred or damaged by the Contractor's operations shall be removed and replaced or neatly trimmed and restored to their original condition as required by the Engineer. The Contractor shall be responsible for all damage to roadside growth due to his operations and shall, without compensation, satisfactorily repair or replace all such damaged growth. Scars on trees shall be painted as soon as possible with an approved tree paint.
- H. The Contractor shall protect existing structures, shall provide lights and fences and take all other precautions that may be necessary to protect life and property at no additional expense to the Authority. The Contractor shall carry on all operations and use equipment of such types that noise resulting from construction operations will be kept to a minimum. Barriers and bridges shall be provided for the protection and use of the public and for the protection of the Work as necessary. The Contractor shall provide and maintain access for occupant and customer entrance to and exit from all adjacent buildings and property at all times. All temporary facilities required for the general protection of the public and the Work shall be subject to approval of the Authority.
- I. Prior to commencing Work, the Contractor shall record the existing condition of abutting property. The Contractor shall obtain the necessary permission for entry and cause a detailed examination to be made of such abutting property as the Contractor deems necessary, as required in the Supplementary Conditions, or as directed by the Engineer. The Contractor shall invite the owner, in writing or by registered mail, to be present during the examination. A representative of the Authority shall also be invited. A complete report of the existing conditions, including photographs, if required, shall be made in triplicate, and signed by the Contractor. One copy shall be delivered to the owner, one to the Authority and one shall be retained by the Contractor. If at any time thereafter a claim for damages or alleged damages is filed by the owner or tenant, the Contractor shall make further detailed examinations. A representative of the Authority will be invited to attend. All facts as to changes between the then existing conditions of said property and those which existed at the time of the original examination shall be noted and recorded in-triplicate. One copy of this report shall be delivered to the owner, one to the Authority, and one shall be retained by the Contractor.
 - 1. In the event that the Contractor cannot obtain from the owner of such abutting property permission to enter upon the property for such examination, the Contractor shall immediately notify the Authority.

2. For these detailed examinations, the Contractor shall employ an independent person who has had previous experience in examining or surveying the conditions of the property and who shall be approved by the Authority.
- J. The Contractor shall conform to all requirements of this Article and shall serve written notice to all Utility Owners or officials and to all others concerned with or having charge of public or private-owned utilities, of his intention to commence operations affecting such utilities at least one week in advance of the beginning of such operations. The Contractor shall at the same time file a copy of said notices with the Engineer.
- K. The Contractor shall confine his movements and operations insofar as possible to the area within the limits of the Work, and the area outside the limits of the Work shall not be disturbed except as directed.
- L. All costs of work included in this subsection shall be borne by the Contractor and no separate payment will be made to the Contractor.

5.11 [NOT USED]

5.12 PROTECTION OF FENCES

- A. By constructing temporary fences, or by other adequate means, the Contractor shall restrain stock from leaving the lands wherein they are confined or from trespassing which would be made possible by, or which might result from, the removal or destruction of existing fences or the carrying out of any part of the Work under the Contract. The Contractor shall be responsible for all loss, injury, or damage that may result from the Contractor's failure to restrain stock as above provided. Compensation for erecting and maintaining temporary fences and for otherwise providing for the restraint of stock shall be considered as included in the lump sum Contract price and no additional compensation will be allowed therefor.
- B. If the Contractor is ordered by the Engineer to construct new right of way fences or to move and reconstruct existing fences, such Work shall be paid for as Extra Work.
- C. The Contractor shall use care to avoid damaging existing fences. The Contractor shall repair or replace at no additional expense to the Authority, and to the satisfaction of the Engineer, all fences which are in any way damaged by Contract operations.
- D. Tearing down and removal of fences occurring within the right-of-way limits shall be considered to be a part of the clearing and grubbing work as set forth in the Contract Specifications, and payment therefor included in the payment for clearing and grubbing.

5.13 SAFEGUARDING OF EXCAVATIONS

- A. Contractor shall provide safeguards and protection around and in the vicinity of excavations necessary to prevent and avoid the occurrence of damage, loss, injury, and death to property, animals, and persons because of such excavations. Liability for any such damage, loss, injury, or death shall rest with the Contractor.

5.14 DISPOSAL OF MATERIALS OUTSIDE THE WORK SITE

- A. Unless otherwise specified in the Contract Specifications, the Contractor shall make his own arrangements for disposing of waste and excess materials outside the work site at no additional expense to the Authority.
- B. Prior to disposing of material outside the Work site, the Contractor shall obtain written permission from the owner on whose property the disposal is to be made. The Contractor shall file with the Engineer the permit, or a certified copy thereof, together with a written release from the property owner absolving the Authority from any and all responsibility in connection with the disposal of material on said property.
- C. When material is disposed of as provided in Paragraph B. and the disposal location is visible from an MBTA System track or a public highway, the Contractor shall dispose of the material in a manner to the satisfaction of the Engineer and the Owner.
- D. Unless otherwise provided in the Contract Specifications, full compensation for all costs involved in disposing of materials as above specified, including all costs of hauling, shall be considered as included in the lump sum Contract price and no additional compensation will be allowed therefor.

5.15 SAFETY AND FIRST AID REQUIREMENTS

- A. The Contractor shall have a full-time (all working hours/one each shift) on-site experienced Safety Supervisor/Representative, whose **sole** responsibility is on-site safety management. The Contractor shall submit, within five (5) working days after receipt of notification of contract award, to the Engineer (Authority Resident Engineer) a detailed site-specific Safety Program, including the name, experience, and qualifications of the Contractor's full-time, on site Safety Supervisor/Representative and alternate. In the absence of the Safety Representative (e.g. vacation, sick leave, short term shift work not exceeding two weeks) the contractor must assign a full time Authority approved alternate Safety Supervisor/Representative to this contract. All safety submittals must be approved by the Engineer (MBTA Safety Department) prior to the start of construction. No work at the job site shall begin until the Engineer has reviewed and commented on the Contractor's safety program and safety representatives. Implementation and enforcement of the safety program for the forces of the Contractor and all subcontractors shall be the responsibility of the General Contractor.
- B. The Contractor's full-time Safety Supervisor/Representative shall have a thorough knowledge of construction safety and OSHA regulations. If, in the opinion of the Engineer, the Contractor's safety representative is not effective in carrying out the assigned duties as described below, the Engineer may request, in writing, that the Contractor replace the safety representative.

Contractors Safety Supervisors/Representatives and alternate are classified into levels with their qualifications based upon the extent of their construction safety supervisory experience and capabilities, and the nature of each individual contract. All contracts require a Class III Full-time Safety Supervisor/Representative unless otherwise specified. Qualifications for each classification shall include, at minimum:

Class I

Basic safety and health training (minimum requirement: successful completion of OSHA 10 hour Construction Safety and Health training course):

- Two years experience as a construction safety supervisor where safety was 100% of the position responsibility
- Working knowledge of safety regulations and hazard control measures

- Demonstrated ability to conduct safety training
- Working knowledge of safety specific contract hazardous work procedures Physically able to perform the job.

Class II

Five years experience as a construction safety supervisor, three of which include full-time on-site construction safety experience (minimum requirement: successful completion of OSHA 30 hour Construction Safety and Health training course):

- Specialized safety training relevant to the project
- Demonstrated ability in creating a safe work environment
- Working knowledge of safety regulations and hazard control measures
- Demonstrated ability to conduct safety training
- Working knowledge of safety specific contract hazardous work procedures
- Physically able to perform the job.

Class III

Seven years experience as a construction safety supervisor, five of which include full-time on-site construction safety experience (minimum requirement: successful completion OSHA 30 hour Construction Safety and Health or OSHA's Instructor #500 Training course):

- Specialized safety training relevant to the project
- Demonstrated ability in creating a safe work environment.
- Working knowledge of safety regulations and hazard control measures.
- Demonstrated ability to conduct safety training.
- Working knowledge of safety specific contract hazardous work procedures.
- Physically able to perform the job.

- C. The duties of the Safety Supervisor/Representative shall include maintenance of the Contractor's safety program, enforcement of safe practices, and the use of safety equipment and personal protective equipment, and other such activities as may be required by OSHA and the Engineer to maintain job safety and accident prevention. The safety representative shall not be replaced, terminated, nor reassigned without the written approval of the Engineer. A minimum transition of two weeks shall occur. Vacancies in these positions must be filled within two weeks of the vacancy occurring. The Safety Representative shall be assigned full-time to the contract and shall not be utilized concurrently on any other MBTA contract or any other projects outside this MBTA contract.
- D. Attention of the Contractor is, specifically directed to the General and Supplementary Conditions of this Contract, which shall be made a condition of each subcontract entered into pursuant to the Contract. Further, that the Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to health or safety, as determined under construction safety and health standards (Title 29, Code of Federal Regulations, Part 1518, Published in the Federal Register on April 17, 1971) promulgated by the United States Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (83 Stat. 96). This contract will require all contractors and subcontractors to comply one hundred percent (100%) with OSHA's fall protection standard.
- E. The Authority may stop any work that it considers to be unsafe.

- F. The Contractor shall notify the Engineer 48 hours prior to bringing in any hoisting equipment (cranes, etc.) on the Authority's property. Equipment must be inspected by the Engineer (MBTA Safety Department) before being used on the work site.
- G. The Contractor shall assume full responsibility for the safety of all his work. He shall perform work in a manner that will insure the safety of personnel and the work; and not expose personnel and equipment to hazardous or potentially hazardous conditions. All work in the construction of the project shall comply with the requirements of the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) provisions, as well as those of State and local regulations. Safe breathing levels must conform to the Massachusetts Department of Environmental Protection (DEP) standards. In the case of conflict of regulations, the most stringent regulations shall apply.
- H. The Contractor shall provide at the site such equipment and medical facilities as are necessary to supply first-aid service to any person who may be injured in the progress of the work. At least one individual member of the contractor's staff, properly qualified with current certification (Red Cross or equivalent) in basic first aid and cardiopulmonary resuscitation (CPR), must be continuously present, on the site at all times when work is in progress. This individual must also have a general knowledge regarding blood borne pathogens. First-aid equipment shall be complete in all respects. The Contractor shall also have standing arrangements for the removal and hospital treatment of any employee who may be injured or who may become ill.
- I. The Contractor shall promptly report in writing to the Authority all accidents whatsoever arising out of or in connection with the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses. In addition, if death, or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone to the Authority.
- J. If any claim is made by any third person against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the fact in writing to the Authority, giving full details of the claim.

K. REQUIRED TRAINING

1. All workers employed by the Contractor or subcontractors who work within the MBTA property limits i.e. (Authority's stations, track area right-of-way on and/or adjacent to the power traction system, etc.) shall be required to attend a four (4) hour safety awareness course at the Authority's Safety School. A Fifty dollar (\$50.00) Administrative Service cost will be charged per attendee. This Administrative/Service cost will be directly invoiced to the contractor by the Safety Department at the end of each month. The contractor shall remit this fee to the Authority within thirty (30) days of said invoice. The location and the time of such school will be at the sole discretion of the Authority. The purpose of this course is to make the Contractor's personnel aware of the particular hazards related to the Authority's operations. Re-certification is required every three years. This class is separate and in addition to the eight (8) hour Subway Operations Right-of-Way Safety Training.
2. The Contractor shall certify that all employees to be employed at the worksite shall have successfully completed a course in construction safety and health. The course must be approved by the United States Occupational Safety and Health Administration, and it must be at least 10 hours in duration per MGL 30.39S. The Contractor shall submit documentation of successful completion of said course with the first certified payroll report for each employee.
3. All workers employed by the Contractor or subcontractors who work within the MBTA property limits i.e. (Authority's stations, track area right-of-way on and/or adjacent to the

power traction system, etc.) shall be required to attend a one-day, eight-hour training class conducted by Subway Operations Training and the Safety Department. Attendees must successfully complete the Right of Way Safety Training in order to receive a Right of Way license. The license is valid for a two-year period after which the person must attend the Authority's Right of Way re-certification class. To register for the "Right of Way Safety" class, contact:

Supervisor and Chief Rules Examiner of Training
Cabot RTL Training
275 Dorchester Avenue, 2nd floor
Telephone: (617) 222-5377

- L. All personnel working on the project site, within the MBTA construction project limits are required to wear latest MBTA Approved High Visibility Safety Vest. In addition, all personnel working in the MBTA track area or on the platform will require the use of MBTA flagman.
- M. Work activities necessitating the traction power system (third rail and trolley wire) deenergization will require the services of an Authority power lineman on site at all times.
- N. The Contractor will be required to comply with the applicable requirements of the Environmental Protection Agency's National Emission Standards for Hazardous Air Pollutants, Part 51, Chapter 1, Title 40, Code of Federal Regulations, Subpart B, effective April 6, 1973, and as amended October 5, 1975 (Published October 14, 1975, in the Federal Register), and also subpart M published in June 1984.
- O. All equipment used by the contractor on Authority property must be inspected by the Engineer (MBTA System wide maintenance and Improvement representative) prior to use on the work site and shall not be used if considered unsafe or not conforming to Authority specifications. All contractor/subcontractor equipment (including hi-rail) operators must be trained, certified, and properly licensed for each specific piece of equipment they will operate. The contractor/subcontractor must keep a copy of the Manufacturers Operating Manual or instructions onboard the hi-rail equipment at all times. The contractor/subcontractor hi-rail vehicles must be equipped with and exhaust gas purifier, and the hi-rail equipment used shall comply with requirements of the hi-rail equipment manufacturer. Documentation of same must be readily available and provided to the Authority upon inspection. If the contractor/subcontractor equipment is involved in a derailment or a near miss incident or accident which caused injury or exposed personnel to injury and/or caused damage to Authority property, that equipment is subject to the Authority's Impound Policy/Procedure. Contractor equipment to be used on or in the vicinity of the tracks shall be in first-class condition, so as to positively prevent any failure that would cause delay in Authority operations or damage to its property or compromise the health and safety of personnel working on the project. Equipment shall not be placed or operated within fouling distance (15' from the centerline) of track without first obtaining the permission of the Authority.
- P. The Authority will not compensate the Contractor for delays or denials to work when the Contractor is in violation of the above regulations.

5.16 RESPONSIBILITY FOR DAMAGE CLAIMS

- A. The Contractor shall indemnify, defend, and save harmless the Authority and all its officers, agents, and employees against all suits, claims, or liability of every name and nature, for or due to any injuries to persons or damage to property arising out of or in consequence of the arts of the Contractor in the performance of the Work covered by the Contract or failure to comply with the terms and conditions of said Contract, whether by the Contractor or the Contractor's employees or subcontractors.

- B. The Contractor shall be held responsible for any and all claims for damage to underground structures and utilities due to the Contractor's operations or to the operations of any of the Contractor's subcontractors.
- C. The Authority agrees to indemnify the Contractor against loss by reason of the liability to pay damages to others for entry upon any land included within and adjoining the boundaries of the area within which the Work is to be provided as set forth in the Contract Documents applying to such Contract or any approved changes thereof or for damage sustained upon any lands adjoining said land by reason of the flowage or drainage of water thereto or therefrom, in any case wherein such damages and interest or easement in such adjoining area, provided that the Authority acting by an authorized representative thereof has issued a notice in writing to the Contractor prior to the making of any entry upon such premises directing or permitting the Contractor to proceed with the Contract and to make such entry upon the premises for the purpose of providing the Work required by said Contract, or any approved alteration thereof, and provided, further, that the Contractor has given notice in writing to the Authority within 15 days after receiving notice of any claim to come in and settle the same and upon the commencement of any action against the Contractor to come in and defend said action, but in no event shall any such damage claim be compromised or adjusted without the written consent of the Authority. The provisions of this Article shall in no way relieve the Contractor from any liability for damage to property of others caused by the Contractor's negligence or that of the Contractor's employees nor shall they be construed to require the Authority to indemnify the Contractor against any loss resulting from such acts of negligence.

5.17 CLAIMS AGAINST CONTRACTOR FOR PAYMENT OF LABOR AND MATERIALS

- A. The Contractor shall be responsible for prompt payment for all services, labor, equipment, and materials furnished by or through the Contractor for purposes of the Contract.
 - 1. Forthwith after the Contractor receives payment for a periodic estimate, the Contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the Contractor.
 - 2. Not later than the sixty-fifth day after each subcontractor substantially completes its work in accordance with the Contract Documents, the entire balance due under the subcontract less amounts retained by the Authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the Authority will pay that amount to the Contractor. The Contractor shall forthwith pay to the subcontractor the full amount received from the Authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the Contractor.
 - 3. Each payment made by the Authority to the Contractor pursuant to subparagraphs 1. and 2. of this Article for the labor performed and the materials furnished by a subcontractor shall be made to the Contractor for the account of that subcontractor; and the Authority will take reasonable steps to compel the Contractor to make each such payment to each such subcontractor. If the Authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the Contractor or which is to be included in a payment to the Contractor for payment to the subcontractor as provided in subparagraphs 1. and 2., the Authority shall act upon the demand as provided in this Article.
 - 4. If, within 70 days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the Contractor the balance due under the subcontract, including any amount due for extra labor and materials furnished to the Contractor, less any amount retained by the Authority as the estimated cost of completing the incomplete and unsatisfactory items of Work, the subcontractor may demand direct

payment of that balance from the Authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the Authority, and a copy shall be delivered to or sent by certified mail to the Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within 10 days after the subcontractor has delivered or so mailed the demand to the Authority and delivered or so mailed a copy to the Contractor, the Contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the Authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain detailed breakdown of the balance due under the subcontract, including any amount due for extra labor and materials furnished to the Contractor and of the amount due for each claim made by the Contractor against the subcontractor.

5. Within 15 days after receipt of the demand by the Authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the Authority will make direct payment to the subcontractor of the balance due under the subcontract, including any amount due for extra labor and materials furnished to the Contractor, less any amount (1) retained by the Authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (2) specified in any court proceedings barring such payment, or (3) disputed by the Contractor in the sworn reply; provided, that the Authority will not deduct from a direct payment any amount as provided in part (3) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph 4. The Authority will make further direct payment to the subcontractor forthwith after the removal of the basis for the deductions from direct payments made as provided in parts (1) and (2) of this subparagraph.
6. The Authority will forthwith deposit the amount deducted from a direct payment as provided in part (3) of subparagraph 5, in an interest-bearing joint account in the names of the Contractor and the subcontractor in a bank in Massachusetts selected by the Authority or agreed upon by the Contractor and the subcontractor and shall notify the Contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the Contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.
7. All direct payments and all deductions from demands for direct payments deposited in an interest bearing account or accounts in a bank pursuant to subparagraph 6, shall be made out of amounts payable to the Contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later became payable to the Contractor and in the order of receipt of such demands from subcontractors. All direct payments will discharge the obligation of the Authority to the Contractor to the extent of such payment.
8. The Authority will deduct from payments to the Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph 6, are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall be right in such deductions prior to any claims against such amounts by creditors of the Contractor. Subcontractor, for contracts awarded as provided in paragraph (a) of Section Thirty-Nine M, Chapter Thirty shall mean a person approved by the Authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the Contractor.

5.18 PAYMENT OF TAXES

- A.** Contract price paid for the Work shall include full compensation for all taxes which the Contractor is required to pay whether imposed by federal, state, or local government, including, without being limited to, federal excise tax.
- B.** However, attention is directed to the Massachusetts Sales Tax, Chapter 64H, Section 6 and the Massachusetts Use Tax, Chapter 64I, Section 7, which state that these taxes are not applicable to the sales of construction materials and supplies incorporated, consumed, employed or expended in construction projects of the Authority. This exemption is also applicable to rental charges for construction vehicles, equipment, and machinery rented, specifically for use on the site of the Authority's construction projects. Bidders are directed to exclude any allowance for Sales or Use Tax from their Bid Form as said tax would relate to the foregoing specific categories. The MBTA Sales Tax Exemption Number is E-042-323-989.

5.19 CLAIMS OF CONTRACTOR FOR COMPENSATION

- A.** No person or corporation, other than the signer of the Contract as Contractor, now has any interest hereunder, and no claim shall be made or be valid; and neither the Authority nor any member, agent, or employee thereof, shall be liable for, or be held to pay, any money except as provided in Article 2.2, 2.3, 2.4, 2.5, and Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM), of these Standard Specifications and Clause 3 of the Contract.
- B.** All claims of the Contractor for compensation other than as provided for in the Contract due to any act of omission or commission by the Authority or its agents must be made in writing to the Engineer within 10 days after the beginning of any work or the sustaining of any damage due to such act. Such written statement shall contain a description of the nature of the Work provided or damage sustained; and the Contractor, shall on or before the fifteenth day of the month succeeding that in which such Work is performed or damage sustained file with the Engineer an itemized statement of the details and amount of such work or damage. Unless such statement shall be made as required, the claim for compensation shall be forfeited and invalidated, and the Contractor shall not be entitled to payment due to any such work or damage. Such notice by the Contractor and the keeping of costs by the Engineer shall not in any way be construed as proving the validity of the claim. The provisions of this paragraph shall not apply to changes in quantities as provided under Article 2.5 or to Extra Work ordered by the Engineer in writing.
- C.** On the basis of information provided in writing by the Contractor's own employees, servants, or agents, the Contractor shall certify, in writing, that the Work for which he is claiming payment, other than as provided for in the Contract, is work actually performed, and the costs as shown are the amounts legally due for providing such Work for which payment is claimed.
- D.** The Engineer will determine all questions as to the amount and value of such Work, and the fact and extent of such damage and will notify the Contractor in writing of this determination.
- E.** Acceptance by the Contractor of the final payment made under the provisions of Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM) shall operate as and shall be a release to the Authority and every member, agent, and employee thereof, from all claim and liability to the Contractor for anything done or furnished for, or relating to, the Work, or for any act or neglect of the Authority or of any person relating to or affecting the Work except the claim against the Authority for the remainder, if any there be, of the amounts kept or retained as provided in Article 5.17. For claims for extensions of time, see Article 6.8.

5.20 OPENING PORTIONS OF CONTRACT FOR OPERATION

- A. Any portion of the Work which is in acceptable condition for operation may be opened for MBTA Transit System operation as directed in writing by the Engineer, but such opening for operation shall not be construed as an acceptance of the Work or part thereof, nor shall it act as a waiver of any of the provisions of the Contract Specifications or of the Contract; provided, however, that on such portions of the Contract as are opened for such use, the Contractor shall not be required to assume any expense entailed in maintaining the MBTA Transit System for operation. The Authority will be responsible for maintenance and any damage to the Work caused solely by MBTA Transit System operation on any portion of the Contract which has been opened to operation as stipulated above, and it may order the Contractor to repair or replace such damage, where upon the Contractor shall make such repairs at Contract unit prices so far as the same are applicable, or as Extra Work under the provisions of Article 2.3, if there are no applicable items in the Contract.
- B. If the Contractor is dilatory in completing any portion of the Work, the Engineer may order all or a portion of the Work open use by the Authority, but in such event the Contractor shall not be relieved of his liability and responsibility during the period the Work is so opened prior to final acceptance. The Contractor shall conduct the remainder of his construction operations so as to cause the least obstruction to the Authority.

5.21 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

- A. Until final written acceptance of the Work, the Contractor shall have the charge and care of the Work. The Contractor shall take every necessary precaution against injury or damage to the Work by action of the elements, or from any other cause, whether arising from the execution or the nonexecution of the Work, and especially when blasting is to be done.
- B. Except as provided in Article 2.9, the Contractor shall bear all losses resulting from or due to the amount or the character of the work or because the nature of the land in or on which the Work is done is different from that which was estimated or expected, or due to bad weather or other causes.
- C. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the Work occasioned by any cause before its completion and final acceptance, and all bear the expense thereof, except damage to the Work due to war, whether or not declared civil war, insurrection, rebellion or revolution, or to any act or condition incident to any of the foregoing, to "Acts of God" (limited to hurricane, tornado, cyclone and earthquake as classified by the United States Weather Bureau for the particular locality and for the particular season of the year and in addition thereto, damages resulting directly from flooding from any of the aforementioned "Acts of God"). The repair of such damages shall be done by the Contractor and paid for as Extra Work in accordance with Paragraph 2.3. In any case in which the estimate for replacing such Work or repairing such damage caused by war, whether or not declared, civil war, insurrection, rebellion or revolution, or to any act or condition incident to the foregoing, or an "Act of God" combined with any previously authorized Extra Work results in a change of such magnitude as to be incompatible with competitive bid status, the Authority reserves the right to terminate the Contract and to call for new bids and award a new Contract for such Work. In the event a Contract is terminated for such reason, the Authority will pay the Contractor such sum as may be due for Work performed up to the date of the "Act of God", or of damage directly due to war, whether or not declared, civil war, insurrection, rebellion or revolution, or to any act or condition incident to any of the foregoing and will also take over and pay for any material stored at the site of the Work provided said material was intended to be and could have been incorporated into the Work; the Authority will also take over and pay for any material which was being especially fabricated for incorporation into the Work, provided, however, that as a condition precedent to the Authority's liability for such material, the Contractor is legally liable therefor and the material was intended to be and could have been incorporated in the Work.

- D. Issuance of an estimate on any part of the Work done will not be construed as final acceptance of any Work completed up to that time.
- E. Should the Contractor fail to take prompt action whenever conditions make it necessary, the Authority will make emergency repairs or cause the same to be made, with the stipulation that the costs for such repairs shall be charged against the Contractor and deducted from moneys due the Contractor.
- F. In case of suspension of Work from any cause whatever, the Contractor shall be responsible for the Contract and shall take such precautions as may be necessary to prevent damage to the Work, provide suitable drainage and shall erect any necessary temporary structures, signs, or other facilities at no additional expense to the Authority. The Contractor shall also maintain in an acceptable growing condition all living material in newly established plantings, seeding, and sodding furnished under the Work, and take adequate precautions to protect new tree growth and other important vegetative growth against injury.

5.22 CONFLICT OF INTEREST

- A. It is understood and agreed that no gift, loan, or other thing of value has been or shall be given to any employee, agent, or officer of the Authority in connection with the award or performance of the Contract. Also no employment shall be given to and no renting, leasing, or purchasing of equipment, supplies, or materials shall be arranged or made with or through any employee, agent, or officer of the Authority by the Contractor.
- B. No Board Member, officer or employee of the Authority, officer or employee of any independent authority or political subdivision of the Commonwealth of Massachusetts, officer, employee or elected official of the Commonwealth of Massachusetts, officer, employee or elected official of any city, county or town within the Commonwealth of Massachusetts, officer, employee or elected official of any city, county or town authority within the Commonwealth of Massachusetts, during his/her tenure and for one year thereafter shall have any interest, direct or indirect, in this contract or the proceeds thereof.
- C. No member of or delegate to the Congress of the United States shall be admitted to any share or part of this contract or to any benefit arising therefrom.

5.23 PERSONAL LIABILITY OF AUTHORITY OFFICIALS

- A. In carrying out any of the provisions of the Contract Documents, or in exercising any power or authority granted to them by or within the scope of the Contract, there shall be no liability upon the Directors, Engineer, or their authorized representatives, either personally or as officials of the Authority, it being understood that in all such matters they act solely as agents and representatives of the Authority.

5.24 NO WAIVER OF LEGAL RIGHTS

- A. Authority shall not be precluded or stopped by any measurement, estimate, or certificate made either before or after the completion and acceptance of the Work and payment therefor, from showing the true amount and character of the Work provided and materials furnished by the Contractor, nor from showing that any such measurement, estimate, or certificate is untrue or is incorrectly made, nor that the Work or materials do not in fact conform to the Contract. The Authority shall not be precluded or stopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the Contractor or the Contractor's sureties, or both,

such damage as it may sustain by reason of the Contractor's failure to comply with the terms of the Contract. Neither the acceptance by the Authority, or any representative of the Authority, nor any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the Authority, shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damages. A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach. Any remedy provided in the Contract shall be taken and construed as cumulative, that is, in addition to each and every other remedy herein provided; and the Authority shall also be entitled as of right to writ of injunction against any breach of any of the provisions of the Contract.

5.25 LABOR, LODGING, BOARD, MAXIMUM HOURS OF EMPLOYMENT, KEEPING OF PAYROLL RECORDS

- A. Every employee in public work shall lodge, board, and trade where and with whom the employee elects; and no person or person's agents or employees under contract with the Authority for the doing of public work, shall directly or indirectly require as a condition of employment therein, that the employee shall lodge, board, or trade at a particular place or with a particular person (Chapter 149, Section 25 of the General Laws of the Commonwealth).
- B. No laborer, workman, mechanic, foreman, or inspector working within this Commonwealth, in the employ of the Contractor, subcontractor, or other person doing or contracting to do the whole or a part of the Work contemplated by the Contract, shall be required or permitted to work more than 8 hours in any one day or more than 48 hours in any one week, or more than six days in any one week, except in cases of emergency. The Authority or the Contractor or any subcontractor may employ laborers, workmen, mechanics, foremen, and inspectors for more than 8 hours in any one day in the work to be done or under the Contract when, in the opinion of the Commissioner of Labor and Industries, public necessity so requires. (Chapter 149, Section 34 of the General Laws of the Commonwealth, as amended.)
- C. Upon request of the Engineer or the Massachusetts Department of Labor and Industries, the Contractor shall furnish certified copies of any or all payrolls for the Contract, showing the name, address, and occupational classification of each employee on said Works, and the hours worked by, and the wages paid to each such employee. Such payroll shall also include the rates paid for rented trucks or rental equipment of any kind used on the Work. This requirement shall also apply to the work of any subcontractor, having a subcontract for any of the Work performed on the Contract. Such records shall be kept in such manner as the Commissioner of Labor and Industries shall prescribe, and shall be open to inspection by the Engineer or any authorized representative of the Department of Labor and Industries at any reasonable time and as often as may be necessary.
- D. In case the Work covered by the Contract is financed from federal funds, the above provisions relative to the hours of employment shall be subject to such revision and amendment as are required by the Rules and Regulations controlling the expenditures of such federal funds.

5.26 EQUAL OPPORTUNITY CLAUSE

- A. During the performance of the Contract, the Contractor agrees as follows:
- B. The Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, religion, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and

selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

- C. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants shall receive consideration for employment, without regard to race, creed, color, religion, sex, or national origin.
- D. The Contractor shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- E. The Contractor shall comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and of the rules, regulations and relevant orders of the Secretary of Labor.
- F. The Contractor shall furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts of investigation to ascertain compliance with such rules, regulations, and orders.
- G. In the event of the Contractor's noncompliance with the nondiscrimination clauses of the Contract or with any of the said rules, regulations or orders, the Contract may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, as amended or by rules, regulations, or orders of the Secretary of Labor, or as otherwise provided by law.
- H. The Contractor shall include the portion of the sentence immediately preceding paragraph A. and the provisions of paragraphs A. through G. in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, as amended so that such provisions shall be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.
- I. Applicable Massachusetts and Federal Anti-Discrimination Requirements are contained in the Appendix to the Bid Conditions, Affirmative Action Requirements, Equal Employment Opportunity of the Supplementary Conditions.

5.27 REQUIREMENTS OF CHAPTER 30, SECTION 39R OF GENERAL LAWS OF THE COMMONWEALTH OF MASSACHUSETTS

- A. The words defined below shall have the meaning stated whenever they appear in this subsection:
 - 1. "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to Section 39M of Chapter 30.
 - 2. "Contract" means any contract awarded or executed pursuant to Section 39M of Chapter 30.

3. "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.
4. "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of this person's residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the awarding authority.
5. "Audit", when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a certified opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.
6. "Accountant's Report", when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which she has made and sets forth her opinion regarding the financial statements taken as a whole with a listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefore shall be stated. An accountants report shall include as a part a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.
7. "Management", when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the contractor.
8. Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

B. Subsection A2 hereof notwithstanding, every agreement or contract awarded or executed pursuant to Section 39M of Chapter 30 shall provide that:

1. The Contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor, and
2. until the expiration of six years after final payment, the awarding authority, office of inspector general, and the deputy commissioner of capital planning and operations shall have the right to examine any books, documents, papers or records of the Contractor or of his/her subcontractors that directly pertain to, and involve transactions relating to, the Contractor or his/her subcontractors, and
3. if the agreement is a contract as defined herein, the Contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the awarding authority, including in his/her description the date of the change and reasons therefore, and shall accompany said description with a letter from the Contractor's independent certified public accountant approving or otherwise commenting on the changes, and
4. if the agreement is a contract as defined herein, the Contractor has filed a statement of management on internal accounting controls as set forth in paragraph C. below prior to the execution of the contract, and

5. if the agreement is a contract as defined herein, the Contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph D. below.
- C. Every Contractor awarded a contract shall file with the awarding authority a statement of management as to whether the system of internal accounting controls of the Contractor and its subsidiaries reasonably assures that:
1. transactions are executed in accordance with management's general and specific authorization;
 2. transactions are recorded as necessary
 - a. to permit preparation of financial statements in conformity with generally accepted accounting principles, and
 - b. to maintain accountability for assets;
 3. access to assets is permitted only in accordance with management's general or specific authorization; and
 4. the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.
- Every Contractor awarded a contract shall also file with the awarding authority a statement prepared and signed by an independent certified public accountant, stating that she has, examined the statement of management on internal accounting controls, and expressing an opinion as to
5. whether the representations of management in response to this paragraph and paragraph B. above are consistent with the result of management's evaluation of the system of internal accounting controls; and
 6. whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicants financial statements.
- D. Every Contractor awarded a contract by the Commonwealth or by any political subdivision thereof shall annually file with the awarding authority during the term of the contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountants report.
- E. The office of inspector general, the deputy commissioner for capital planning and operations and any other awarding authority shall enforce the provisions of this section. The deputy commissioner of capital planning and operations may after providing an opportunity for the inspector general and other interested parties to comment, promulgate pursuant to the provisions of Chapter 30A such rules, regulations and guidelines may be applicable to all awarding authorities. A Contractor's failure to satisfy any of the requirements of this section may be grounds for disqualification pursuant to Section 44C of Chapter 149.
1. Note: The record retention aspects of this subsection apply to all contracts awarded by the Authority regardless of value. The requirements relative to the internal auditing and management controls, including the filing of an annual statement, apply to contracts awarded with a value greater than \$100,000.

PART 6 - PROSECUTION AND PROGRESS

6.1 SUBLETTING OR ASSIGNMENT OF CONTRACT

- A.** The Contractor shall give personal attention to the fulfillment of the Contract and shall keep the Work under control.
- B.** The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of the Contractor's right, title, or interest therein, without written consent of the Authority. If consent is given, the Contractor shall be permitted to sublet a portion thereof, but shall provide with the Contractor's own organization, Work amounting to not less than 50 percent of the original total Contract amount, except that any items designated in the Contract as "specialty items" may be provided by subcontract and the amount of any such specialty items provided by subcontracts may be deducted from the total amount in computing the amount of Work required to be provided by the Contractor's own organization. No subcontracts, or transfer of contract, shall in any case release the Contractor from liability under the Contract and bonds.
- C.** Consent to sublet any part of the Work shall not be construed to be an approval of the said subcontract or of any of its terms, but shall operate only as an approval of the making of a subcontract between the Contractor and subcontractor.
- D.** A subcontractor (vendor, or supplier) will be recognized only in the capacity of an employee or agent of the Contractor, and the subcontractor's removal may be required as in the case of an employee.
- E.** As soon as practicable after execution of the Contract, the Contractor shall submit to the Authority applications for approval of subcontractors for any part of the Work A is proposed to sublet. In addition to stating the name and address of the proposed subcontractor each application shall give the items, or any portions thereof, proposed to be sublet, and the total value of the Work proposed to be sublet based on the approved breakdown estimate of a lump sum price required under Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM), and not on the amount of the subcontract. The application shall also show other pertinent information in order to enable the Authority to ascertain whether the proposed subcontractor is reliable and able to perform the work.
- F.** The Contractor shall direct the attention of subcontractors to the requirements of:
 - 1. Article 5.4 regarding insurance, and also to the Minimum Wage Rates and Health and Welfare and Pensions Fund Contributions as determined by the Commission of Labor and Industries of the Commonwealth and also to the provisions of Article 5.25 and 5.26; and:
 - 2. Chapter 30, General Laws of the Commonwealth, Section 39L, requires under 1. above that the Commonwealth and every county, city, town, district, board, commission shall not enter into a contract for such Work with, and shall not approve as a subcontractor furnishing labor and materials for a part of any such Work, a foreign corporation which has not filed with the Authority a certificate of the State Secretary stating that such corporation has complied with Sections 3 and 5 of Chapter 181 and the date of such compliance. Chapter 181, Section 3, requires foreign corporations to appoint the Secretary of the Commonwealth as an attorney for service of process, and Section 5, Chapter 181, requires foreign corporations to file certain documents with the Secretary of State which will permit them to do business in Massachusetts.
- G.** The Contractor shall direct the attention of subcontractors and of all suppliers of material to the requirements of Article 3.9, and Section 01400 - QUALITY ASSURANCE, regarding facilities for the Engineer and his inspectors.

6.2 PROSECUTION OF WORK

- A. The Contractor shall commence Work within fifteen (15) calendar days from the date of the mailing of the executed contract to the Contractor unless otherwise ordered in writing by the Engineer; and he shall complete milestones specified in Article 6.4 – LIMITATIONS OF OPERATIONS of this Section 00700 – GENERAL CONDITIONS within the days specified below from the date of the mailing of the executed contract to the Contractor.
- B. In the event the Contractor fails to complete the specified milestones within the days specified, liquidated damages will be assessed pursuant to Section 00700, Article 6.9 of the General Conditions for each calendar day of delay in the completion of the specified milestones as follows:

BASE CONTRACT

<u>Milestone / Phase</u>	<u>No. of Days</u>	<u>Liquidated Damages</u>
MS1 / Phase 1	249 calendar days after Notice to Proceed	
	Use of Phase 1 Work Area – maximum 48 work days	\$2,800/work day
MS2 / Phase 2	355 calendar days after Notice to Proceed	
	Use of Phase 2A Work Area – maximum 32 work days	\$5,800/work day
	Use of Phase 2B Work Area – maximum 23 work days	\$3,800/work day
	Use of Phase 2C Work Area – maximum 23 work days	\$1,900/work day
MS3 / Phase 3	429 calendar days after Notice to Proceed	\$2,800/work day
	Use of Phase 3 Work Area – maximum 50 work days	\$2,860/work day
Non-Sequential Phase Work (part of Milestone MS4)	Use of Toilet Room Work Area – maximum 39 days	
MS4 / Substantial Completion of Work	429 calendar days after Notice to Proceed	\$2,800/calendar day
MS5 / Completion of Entire Work	60 calendar days after MS4 / Substantial Completion of Work	

In no event shall the total amount of liquidated damages for failure to complete the above milestones within the days specified exceed **\$5,800.00** for any one day.

- B. Should the prosecution of the Work for any reason be discontinued, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations.
- C. If in the Engineer's judgment it is necessary at any time, the Contractor shall when directed, employ such forces and equipment for one or more additional shifts as will be required to insure the proper and timely completion of the Work.

- D. The Contractor shall not provide work at any time when conditions are unsuitable for its execution, safety, and permanence. This provision shall not be interpreted as constituting any waiver, release or lessening of the Contractor's obligation to bring the Work to entire completion within the Contract time stipulated therefor.
- E. The Contractor shall not receive any additional compensation for the requirements of this Article.

6.3 REMOVAL OR DEMOLITION OF BUILDINGS AND LAND TAKINGS

- A. When the removal or demolition of buildings within the Contract limits is done under other and separate contracts, the provisions of Article 3.6 shall apply. The Authority will not be held liable for any expense to the Contractor due to any delay or interference with his Work, due to removal or demolition of the buildings, or due to any failure to remove or demolish any buildings, or due to the necessary land takings.
- B. No allowance of any kind will be made except as provided in Article 6.8.

6.4 LIMITATIONS OF OPERATIONS

A. GENERAL

- 1. This Article 6.4 – LIMITATIONS OF OPERATIONS includes requirements related to phasing, scheduling, sequencing the Work, construction limitations, and permitting continuous occupancy and operations by the Authority throughout the construction period.
 - a. The General Contractor is responsible for overall coordination of the work and all Subcontractors in accordance with the requirements of this Article.
 - b. Requirements in this Section apply to all trades and all Subcontractors.
 - c. To minimize disruption to the Authority's operations, specific phasing, construction methods or procedures may be indicated. Where methods are enumerated or indicated by inference, the Contractor shall comply with those requirements.
 - d. Nothing in this Section shall be construed as limiting the Contractor's responsibility for coordination of the work, materials and methods, meeting the project construction schedule, or for the safety of persons or property.
- 2. Related Work:
 - a. Section 01322 – CONSTRUCTION SCHEDULE (LUMP SUM), for preparation of Contract Schedules to incorporate phasing and limitations noted in this Section 01013.
 - b. Other requirements related to phasing and sequencing are included in the respective sections where trade work is specified. These sections are complementary.

B. AUTHORITY'S OCCUPANCY AND OPERATIONS REQUIREMENTS

- 1. Except as otherwise noted, the Authority's occupation and operations in and around the Riverside Carhouse will continue unabated throughout the duration of the construction contract. The Riverside Carhouse is continuously operated twenty-four hours a day and seven days a week. The Authority's work shifts are as follows:
 - a. First work shift: 7 am to 3 pm.
 - b. Second work shift: 3 pm to 11 pm.
 - c. Third work shift: 11 pm to 7 am.

2. Cooperate with the Authority and perform the work to minimize conflicts and not interfere with the Authority's continued usage of the facilities. The Work to be performed shall be limited to provide the least possible interference with the Occupants.
 - a. Schedule and coordinate the work to minimize time required to perform the work.
3. Except for permitted temporary shut downs, maintain or provide all necessary services required to facilitate continuous occupancy of building throughout construction period, whether or not specifically enumerated in the contract documents, as may be reasonably required by the Authority. These services are in addition to and separate from temporary construction facilities and controls specified in Section 01500 and Section 01560. Required facilities and services may include, but are not limited to:
 - a. Water and sewer service.
 - b. Lighting and power throughout occupied areas.
 - c. Fire protection and fire alarm service.
4. Permitted Temporary Shut Downs: In coordination with the Authority, limited shut down of required facilities and services will be permitted as follows:
 - a. Water, sewer, fire protection and miscellaneous power: Up to four hours during the work day. Restore service by the end of each work day.
 - b. Fire protection: Up to four hours at premium time. Cooperate with the Authority's insurance provider for each shut down. Provide fire watch as required.
 - c. Provide one week's notice for all shut downs of required facilities and services.

C. EGRESS

1. General: Required means of egress shall remain usable for emergency use throughout the construction period, unless otherwise permitted by the Authority and by authorities having jurisdiction.

D. HOLIDAYS

1. No construction work may be performed on the following holidays:
 - a. New Year's Day – January 1st.
 - b. Martin Luther King – 3rd Monday in January.
 - c. Presidents Day – 3rd Monday in February.
 - d. Patriots Day – 3rd Monday in April.
 - e. Memorial Day – 4th Monday in May.
 - f. Bunker Hill Day – June 17th.
 - g. July 4th.
 - h. Labor Day – 1st Monday in September.
 - i. Columbus Day – 2nd Monday in October.
 - j. Veterans Day – November 11th.
 - k. Thanksgiving – 4th Thursday in November.
 - l. Christmas Day – December 25th.

E. PHASING DEFINITIONS

1. General: Indicated portions of the work shall be performed sequentially in discrete work phases as indicated below, with each trade and subcontractor completing work indicated in phase before proceeding to the next, except as otherwise noted.
 - a. Coordinate and schedule all trades to comply. Schedule and sequence activities included in Work to assure efficient and orderly installation of each component. Coordinate operations that are dependent on each other for proper installation and operation, including the work of Subcontractors.

- b. The division of indicated portions of the work into separate Phases is to generally and summarily describe the sequence in which that work shall be performed. Not all operations or requirements of the contract are indicated.
 - c. Required project Milestones are established in Article 6.2 – PROSECUTION OF WORK in this Section 00700 – GENERAL CONDITIONS.
 - d. The Maximum Allowed Duration includes the date from which each area of work is turned over by the Authority to the Contractor through to the acceptance of the work of each Phase. The Maximum Allowed Duration is for the benefit of the Authority, to limit disruption to the Authority's operations.
 - 1) The tracks adjacent either side of the work area for each Work Platform will be not be utilized by the Authority for the duration of the work of each specified Phase, except as otherwise noted. Catenary at Tracks 2 and 3 for Phase 2, and at Tracks 6 and 7 for Phase 3 will be de-energized by the Authority while construction work takes place in adjacent work areas (Tracks 8, 9 and 10 at Phase 1 do not have catenary). Cooperate with the Authority's lock out/tag out procedure for de-energizing track catenary, in accordance with Section 01568 – CONSTRUCTION SAFETY.
 - e. The Authority will not accept as the basis for a change order or extension of contract time any cost or delays incurred by the Contractor's or any subcontractor's failure to meet the approved schedule due to phasing requirements.
2. Alternate Phasing of the Work: Alternate phasing plans proposed by the Contractor will be considered by the Authority. Criteria for acceptance of alternate phasing will be as follows:
- a. The alternate plan does not increase inconvenience to the Authority.
 - b. There is a substantial scheduling or other benefit accruing to the Authority.
3. Phased Acceptance of the Work: The work of Phases 1, 2 and 3 (as defined below) shall be fully completed, commissioned and accepted by the Authority for use as each Phase is completed. All other Work of the Contract will be accepted by the Authority at Substantial Completion.
- a. Each Phase shall not be complete until all of the conditions required for beneficial use and occupancy as determined by the Engineer for that portion of the work are met.
 - 1) Provide system testing of the fire protection work associated with each Phase, in accordance with the Authority's maintenance company.
 - 2) Remove special protections and construction equipment from work area as work of each Phase is completed.
 - 3) The work shall be performed in a manner to avoid reentry into a previously completed work Phase area.
 - b. Warranties and guarantee periods for each Phase shall begin on the date all work of each Phase is determined to be Substantially Complete. Refer to Articles 2.8 and 3.11 of this Section 00700 – GENERAL CONDITIONS and to Section 01700 – CONTRACT CLOSEOUT.
4. Preliminary Work: FIELD MEASUREMENTS AT RAIL PLATFORMS:
- a. Description:
 - 1) Field measure at each concrete platform for shop drawings.
 - b. Maximum Allowed Duration: 1 work day at each Work Platform.
5. Phase 1 Work / Milestone MS1: WORK PLATFORMS TYPE A2 (Quantity of 2):
- a. Description:
 - 1) Remove existing wood platform structure.
 - 2) Furnish, install and make operational two Work Platform Types A2.
 - 3) Trench for fire protection supply piping.

- 4) Furnish and install fire protection, compressed air, electrical power and lighting.
 - b. Maximum Allowed Duration: 48 work days.
6. Phase 2 Work / Milestone MS2: WORK PLATFORM TYPE B2:
 - a. Description:
 - 1) Furnish and install support columns under concrete platforms.
 - 2) Furnish, install and make operational Work Platform Type B2.
 - 3) Furnish and install fire protection, compressed air, electrical power and lighting.
 - b. Sub-Phases 2A, 2B and 2C: Perform Phase 2 Work in three sections as indicated on phasing plan, working north to south. As each Sub-Phase is complete, the platform shall be fully completed, commissioned and accepted by the Authority for use, and allow the Authority to utilize the existing concrete platform and adjacent Tracks 6 and 7.
 - c. Maximum Allowed Duration: 78 work days.
 - 1) Maximum Allowed Duration for Sub-Phase 2A: 32 work days.
 - 2) Maximum Allowed Duration for Sub-Phase 2B: 23 work days.
 - 3) Maximum Allowed Duration for Sub-Phase 2C: 23 work days.
 - 4) Allow up to four interruptions of three work days each for work stoppage, to permit the Authority to utilize the existing concrete platforms and adjacent Tracks 6 and 7. The Authority will provide a minimum of four hours' notice for each required work stoppage. In preparation for possible work stoppages, at the end of each work day the Work shall be secured in place and the work area cleared, in order that the Authority may utilize the work area, if necessary.
7. Phase 3 Work / Milestone MS3: WORK PLATFORM TYPE B1:
 - a. Description:
 - 1) Furnish and install support columns under concrete platforms.
 - 2) Furnish, install and make operational Work Platform Type B2.
 - 3) Furnish and install fire protection, compressed air, electrical power and lighting.
 - 4) Furnish and install safety signs and padding to existing structure.
 - b. Maximum Allowed Duration: 50 work days.
 - 1) Allow up to four interruptions of three work days each for work stoppage, to permit the Authority to utilize the existing concrete platforms and adjacent Tracks 2 and 3. The Authority will provide a minimum of four hours' notice for each required work stoppage. In preparation for possible work stoppages, at the end of each work day the Work shall be secured in place and the work area cleared, in order that the Authority may utilize the work area, if necessary.
8. Non-Sequential Phase Work / Milestone MS4:
 - a. Description: Non-Sequential Phase Work includes all other Work of the Contract not included above, including but is not limited to:
 - 1) HPCU Room ventilation work.
 - 2) Toilet Room renovation work.
 - 3) Fire protection, lighting and ceiling work in basement corridor.
 - 4) Catenary system modifications.
 - 5) Accessible parking.
 - b. Perform each item of Work in a continuous operation, and in as expeditious manner as possible, to limit inconvenience to the Authority.
 - 1) Maximum Allowed Duration for Toilet Room Work: 39 work days.

- 2) Furnish to the Authority for the Authority's use the HPCU Room mobile fume extraction unit as soon as possible.

F. WORK ZONES

1. Work Zones for the Work Platforms: The Authority will provide to the Contractor limited work zones as follows:
 - a. The existing concrete platform on which the Work Platforms are to be constructed.
 - b. The adjacent rail tracks.
 - c. The rail track exterior overhead door nearest the location of the Work Platforms.
 - d. The area immediately outside of the rail track exterior overhead door, for one delivery truck.

G. MISCELLANEOUS LIMITATIONS

1. The Work of the HPCU Room:
 - a. Work inside the HPCU room shall only be performed during the 11 pm to 7 pm third shift of the work day. At the end of each night's work inside the HPCU Room, the Work shall be secured in place and the work area cleared, in order that the Authority may utilize the work area during the first or second shifts of the work day.
 - b. Provide temporary ventilation after the existing ventilation system is disconnected and until the new ventilation system is operational.

6.5 CHARACTER OF WORKMEN, METHODS, AND EQUIPMENT

- A. The Contractor shall at all times employ sufficient labor and equipment to prosecute the several classes of work to full completion in the manner and time required by the Contract Documents.
- B. The Contractor shall provide all cutting, fitting, and patching of the work that may be required to make its several parts fit together properly, and shall not endanger any work by cutting, excavating, or otherwise altering the work or any part thereof.
- C. All workmen shall have sufficient skill and experience to perform the Work assigned to them. Workmen engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform all work properly and satisfactorily.
- D. Any person employed by the Contractor or by any subcontractor who, in the Engineer's judgment, does not perform the work in a proper and skilled manner or is intemperate or disorderly or otherwise unsatisfactory or not employed in accordance with the provisions of Article 5.25, shall at the written request of the Engineer, be removed by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the Work without the approval of the Engineer.
- E. Should the Contractor fail to take the necessary action to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Engineer may suspend the Work by written notice until such orders are complied with.
- F. The Contractor shall employ engineers registered in the Commonwealth of Massachusetts, qualified superintendents, foremen, and other supervisory employees to plan all construction operations and to represent the Contractor at all of the several parts of the Work and they shall be present at all times while the Work entrusted to them is in progress and shall be informed thoroughly regarding the Work.

- G. All equipment used on the Work shall be of sufficient size and in such mechanical condition as to meet the requirements of the Work and to produce a satisfactory quality of work. Equipment used on any portion of the Work shall be such that no injury to the transit system, city streets, highways, or adjacent property will result from its use.
- H. When methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the Contract, the Contractor may use any methods or equipment that demonstrate to the satisfaction of the Engineer the ability to accomplish the Work in conformity with the requirements of the Contract.
- I. When the Contract Documents specify the methods and equipment by which the construction shall be performed, such methods and equipment shall be used unless otherwise authorized in writing by the Engineer. If the Contractor desires to use a method or type of equipment other than that specified, such authority should be requested in writing from the Engineer. The request shall include a full description of the methods and equipment proposed to be used as an explanation of the reasons for desiring to make the change. If written approval is given, it will be on the condition that the Contractor shall be fully responsible for producing construction work in conformity with the Contract requirements. If after trial use of the substituted methods or equipment, the Engineer determines that the Work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove the deficient Work and replace it with Work of specified quality, or take such other corrective action as the Engineer may direct. No changes will be made in basis of payment for the construction items involved nor in Contract time as a result of authorizing a change in methods or equipment under these provisions.
- J. Prior to the Contractor's selection of the job superintendent, a detailed resume must be submitted to the Authority for approval. Included in the job superintendent's requirements are:
1. Commonwealth of Massachusetts Department of Public Safety License for Construction Supervisor without any restrictions.
 2. A minimum of 10 years of related construction experience.

The above requirements may only be waived by the Director of Construction.

6.6 DELAY AND SUSPENSION OF WORK

- A. The Engineer has the authority to delay the commencement of the Work and delay or suspend any portion thereof, for such period or periods as it may be deemed necessary, because of conditions beyond the control of the Authority or the Contractor, for the failure of the Contractor to correct conditions unsafe for the general public; for failure to carry out provisions of the Contract; for failure to carry out orders; for causes and conditions considered unsuitable for the prosecution of the Work; for acts of third persons not a party to the Contract; or for any other cause, condition, or reason deemed to be in the public interest.
- B. Upon receipt of written order of the Engineer, the Contractor shall immediately delay the commencement of the Work or delay or suspend any portion thereof in accordance with said order. Work shall not be suspended or delayed without prior written approval or order of the Engineer. The work shall be resumed when conditions warrant or deficiencies have been corrected and the conditions of the Contract satisfied as ordered or approved in writing by the Engineer. The Contractor's attention is also directed to the requirements of Section 01560 - TEMPORARY CONTROLS, Part 1 "Laws to be Observed" Article, and Article 5.21 herein which shall govern during any period of temporary or partial suspension of work.

6.7 CLAIM FOR DELAY OR SUSPENSION OF WORK

- A.** The Contractor shall have no claim for damages of any kind due to any delay in commencement of the Work or any delay or suspension of any portion thereof, except as hereinafter provided.
1. Attention is directed to Section 39.0 of Chapter 30 which requires that every contract subject to the provisions of Section 39M of Chapter 30 contain the following provisions a. and b. in their entirety and, in the event a suspension, delay, interruption, or failure to act by the Authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the Contractor for payment for an increase in the cost of his performance as provisions a. and b. give the Contractor against the Authority, but nothing in provisions a. and b. shall in any way change, modify, or alter any other rights which the Contractor or the subcontractor may have against each other.
 - a. The Authority may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the Authority; provided, however, that if there is a suspension, delay, or interruption for 15 days or more or due to a failure of the Authority to act within the time specified in the Contract, the Authority will make an adjustment in the Contract price for any increase in the cost of the Contract but shall not include any profit to the Contractor on such increases; and provided further, that the Authority will not make any adjustment in the Contract price under this provision for any suspension, delay, interruption, or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract price under any other contract provision.
 - b. The Contractor shall submit the amount of a claim under provision a. to the Authority in writing as soon as practicable after the end of the suspension, delay, interruption, or failure to act and, in any event, not later than the date of final payment under the Contract and, except for costs due to a suspension order, the Authority shall not approve any costs in the claim incurred more than 20 days before the Contractor notified the Authority in writing of the act or failure to act involved in the claim.

6.8 DETERMINATION AND EXTENSION OF CONTRACT TIME FOR COMPLETION

- A.** The Contractor shall complete, entirely, and in an acceptable manner, the Work required under the Contract within the time stated in the Bid Form, except that the Contract time for completion shall be adjusted as follows:
1. If the Contract is not awarded as contemplated by Section 00200 – INSTRUCTIONS TO BIDDERS of the Contract Specifications, then the number of days allowed for the completion of the Work will be computed from the date of receipt of the Contract by the Contractor or the date on which the Contractor was ordered to commence work whichever is later. For the purpose of this paragraph, the Contractor will be presumed to have received the Contract on the day following the mailing of the executed Contract to the Contractor by the Authority. If the Contract specifies a specific calendar date for completion and the Contract is not awarded as contemplated by Section 00200, of the Contract Specifications then the Contractor will be entitled to an extension of time equivalent to the number of days elapsed from 60 days (45 days if Federal funds are involved) after the opening of bids up to and including the day of receipt of the executed Contract by the Contractor or the date on which the Contractor was ordered to commence Work whichever is later.
 2. In case commencement of work is delayed or any part thereof is delayed or suspended by the Authority (except for unsuitable weather, winter months, or reasons caused by the fault or neglect of the Contractor), the Contractor will be granted an extension of time in which to complete the Work or any portion of the Work required under the Contract equivalent to the

duration of the delay less a reasonable period of time within which the Contractor could have done necessary preliminary work.

3. When delay occurs due to Force Majeure, the time for completion of the Work shall be extended as determined by the Engineer to be equitable.
 4. An "Act of God" as used in this Article is understood to imply an earthquake, flood, cyclone, or other cataclysmic phenomenon of nature beyond the power of the Contractor to foresee or make preparation in defense of. A rain, windstorm or other natural phenomenon of normal intensity, based on United States Weather Bureau reports, for the particular locality and for the particular season of the year in which the Work is being prosecuted, shall not be construed as an "Act of God" and no extension of time will be granted for delays resulting therefrom. Within the scope of acts of the Government, consideration will be given to properly documented evidence that the Contractor has been delayed in obtaining any material or class of labor because of any assignment of preference ratings by the Federal Government or its agencies to other defense contracts.
 5. In case the Work is delayed by public or private utility owners or municipal agencies, see Article 3.5.
 6. Each Extra Work Order or Change Order as issued will include a statement of additional time, if any, that is agreed upon by the Contractor and the Engineer required for the completion of the Contract by reason of this Extra Work Order or Change Order, and no other time allowance due to the performance of the Work covered by such Extra Work Order or Change Order will be allowed.
- B. An extension of time will not be granted for any delay or any suspension of the Work due to the fault of the Contractor, nor if a written request for an extension of time on account of delay due to any of the aforesaid causes is not filed within 15 days of the date of the commencement of the delay nor if the request is based on any claim that the Contract period as originally established was inadequate.
- C. Contract period has been carefully considered and has been established for reasons of importance to the Authority. This time limit will be enforced.
- D. The probable slow-down or curtailment of Work during inclement weather and winter months has been taken into consideration in determining the total time required to complete the Contract- hence no extension of time will be allowed due to this reason.

6.9 [NOT USED]

6.10 TERMINATION OF CONTRACT

- A. If the Contractor shall be adjudged bankrupt, or make a general assignment for the benefit of creditors, or if a receiver shall be appointed of the Contractor's property, or if the work to be done under the Contract shall be abandoned, or if the Contract or any part thereof shall be sublet without the previous written consent of the Authority, or if the Contract or any claim there under shall be assigned by the Contractor otherwise than as herein specified, or at any time the Engineer certifies in writing to the Authority that the Work, or any part thereof, is unnecessarily or unreasonably delayed, or that the Contractor has violated any of the provisions of the Contract, the Authority may, by written notice, instruct the Contractor to discontinue the Work, or any part thereof, and thereupon the Contractor shall discontinue such Work or such part thereof, as the Authority may designate, and the Authority will require the surety or sureties to complete the Contract.
- B. If the Engineer determines that the rate of progress as reflected by the Contractor's CPM submitted and approved in accordance with the requirements of Section 01300 - SUBMITTALS, is not satisfactory, the Authority, instead of notifying the Contractor to discontinue the Work or any part

thereof, may notify the Contractor from time to time to increase the force, equipment, and plant, or any of them, employed on the whole or any part of the Work, stating the amount of increase required; and unless the Contractor shall, within five working days after any such notice, increase such force, equipment, and plant to the extent required therein, and maintain and employ the same from day to day until the completion of the Work or such part thereof or until the conditions as to the rate of progress shall, in the Engineer's judgment, be fulfilled; or unless the Contractor submits and receives approval of a revised CPM indicating the Work being completed on time, the Authority may employ and direct the labors of such additional force, equipment, and plant as may, in the Engineer's judgment, be necessary to insure the completion of the Work or such part thereof within the time specified, or at the earliest possible date thereafter, and charge the expense thereof to the Contractor. Neither the notice from the Authority to the Contractor, to increase the force, equipment, or plant, nor the employment of additional force, equipment, or plant by the Authority shall be held to prevent a subsequent notice from the Authority to the Contractor to discontinue Work under the provisions of the preceding portion of this Article.

- C. The Engineer may exercise the rights under this paragraph to rectify adverse conditions described in Article 3.10, Removal of Defective or Unauthorized Work, and Article 4.4, Defective Material, and notify the Contractor's bonding company to take the necessary appropriate action to remedy the situation. It shall be understood that when the Authority exercises its rights hereinbefore described, the breach of Contract by the Contractor does not itself constitute termination unless stipulated by the Authority. The Contractor shall, as directed by the Engineer, continue other works of the Contract.
- D. All expenses charged under this Article will be deducted and paid by the Authority out of any moneys then due or to become due the Contractor under the Contract, or any part thereof, and in such accounting, the Authority will not be held to obtain the lowest figures for the Work of completing the Contract or any part thereof, or for insuring its proper completion, but all sums actually paid therefore shall be charged to the Contractor. In case the expenses so charged are less than the sum which would have been payable under the Contract if the same had been completed by the Contractor, the Contractor will be entitled to receive the difference; and in case such expenses shall exceed the said sum, the Contractor shall pay the amount of the excess to the Authority upon completion of the Work without further demand being made therefor.

6.11 TERMINATION FOR CONVENIENCE

- A. If the Engineer determines that it is in the public interest to do so, the Engineer may notify the Contractor to discontinue all work, or any part thereof, such notice shall be given to the Contractor in writing and thereupon the Contractor shall discontinue such work, or such part thereof, as the Engineer may designate.
- B. If the Engineer notifies the Contractor to discontinue all work, or any part thereof, the Engineer shall pay and the Contractor shall accept, as full payment for all work done and materials provided, the following sums:
 - 1. For all work on partially completed items.
 - 2. A sum agreed to by the Contractor and the Engineer or:
 - a. The actual costs for direct labor, materials (less salvage value, if any) and use of equipment, plus 10% of this total for overhead; and
 - b. the actual cost for Workmen's Compensation and Employer's Liability, Insurance, Health, Welfare and Pension benefits, Social Security deductions, and Employment Security Benefits; and
 - c. 6 percent of the total of (a) and (b) for profit and;
 - d. the estimated proportionate cost of surety bonds; and

- e. the actual cost to the Contractor for work performed by a Subcontractor, plus 10 percent of such cost. No allowance shall be made for general superintendence and the use of small tools and manual equipment,
3. For costs of settlement as:
- a. Reasonable and necessary accounting, legal, clerical and other costs of work discontinuance; and reasonable and necessary storage, transportation and other costs incurred for the preservation, protection or disposition of the discontinued work.
 - b. When requested by the Engineer, the Contractor shall furnish itemized statements of the cost of the work performed and shall give the Engineer access to all accounts, bills and vouchers, relating thereto and unless the Contractor, when requested, shall furnish such itemized statements and access to all accounts, bills and vouchers, he shall not be entitled to payment for the work for which such information is sought by the Engineer.
 - c. The Contractor shall not be paid and the Contractor shall not have any claims for loss of anticipated profits, for loss of expected reimbursement or for any increased expenses resulting directly or indirectly from the discontinuance of any or all, work or from unbalanced allocation, among the contract item, of overhead expense on the part of the bidder and subsequent loss of expected reimbursement therefor or for any other cause. The Contractor shall incorporate the provisions of this section as provisions in its contracts with each of its subcontractors.

CERTIFICATE OF COMPLIANCE
(Manufacturer of Fabricated Material)

Date _____ 20__

WE HEREBY CERTIFY THAT

(Description, or Kind of Material)

Furnished to
(Name of Contractor Prime or Sub)

For Use on WORK PLATFORMS FOR RIVERSIDE CARHOUSE Federal No. R20CN01 (Project No.)

In the Amount of
(Quantity Represented)

Identify by
(Label, Marking, Seal No., Consignment, or Waybill No.)

Shipped on _____ 20__ Delivered on _____ 20__

Shipped via

(Method of Shipment, Car No., or Truck No.)

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SUPPLEMENTARY CONDITIONS AND SPECIFICATIONS OF THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY, IN ALL RESPECTS, PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATIONS, DRAWINGS AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

All records and documents pertinent to this certificate and not submitted herewith will be maintained available by the undersigned for a period of not less than three years from date of final payment by the MBTA.

(Manufacturer of Supplier)

Signed by _____

Title _____ NOTARY STAMP

Notarized Signature of Person having Legal Authority to bind the Supplier

INSTRUCTIONS

1. The above is a suitable sample of an acceptable certificate.
2. Certificate is to be submitted in triplicate to the Engineer prior to, or on delivery of, material.
3. The following regulation is applicable to all projects involving Federal Funds.

Section 1001 of Title 18 of the United States Code (Criminal Code and Criminal Procedure) is applicable to this statement. (Section 1001 of Title 18, among other things, provides that whoever knowingly and willfully makes or uses a document or writing containing any false, fictitious or fraudulent statement or entry, in any matter within the jurisdiction of any Department or Agency of the United States shall be fined not more than \$10,000 or imprisoned not more than five years, or both).

END OF SECTION

SUPPLEMENTARY CONDITIONS - FTA

FOREWORD

Further Supplementing the Authority's Standard Specifications, Section 00700 - GENERAL CONDITIONS, the following Supplementary Conditions will apply.

References to Article Numbers in the following Supplementary Conditions unless otherwise stated are to be the aforesaid Standard Specifications, Section 00700 - GENERAL CONDITIONS. In case of conflict between these Supplementary Conditions and the aforesaid Standard Specifications, Section 00700 - GENERAL CONDITIONS, these Supplementary Conditions will take precedence and shall govern.

The Supplementary Conditions are included herein to augment the Standard Specifications, Section 00700 - GENERAL CONDITIONS, with additional information which is applicable to this project.

The enforcement of the requirements of any of the following Supplementary Conditions of the General Conditions shall not be construed as waiving any of the rights of the Authority contained in any of the other conditions of the Contract.

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CERTIFICATE OF COMPLIANCE
(Manufacturer of Fabricated Material)

Date _____ 20____

WE HEREBY CERTIFY THAT _____
(Description, or Kind of Material)

Furnished to _____

For Use on WORK PLATFORMS FOR RIVERSIDE CARHOUSE Federal No. **R20CN01** (Project No.)

In the Amount of _____
(Quantity Represented)

Identify by _____
(Label, Marking, Seal No., Consignment, or Waybill No.)

Shipped on _____ 20____ Delivered on _____ 20____

Shipped via _____
(Method of Shipment, Car No., or Truck No.)

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SUPPLEMENTARY CONDITIONS AND SPECIFICATIONS OF THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY, IN ALL RESPECTS, PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATIONS, DRAWINGS AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

All records and documents pertinent to this certificate and not submitted herewith will be maintained available by the undersigned for a period of not less than three years from date of final payment by the MBTA.

(Manufacturer of Supplier)

Signed by _____

Title _____ NOTARY STAMP

Notarized Signature of Person
having Legal Authority to bind the Supplier

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2. MINIMUM STATE WAGE RATES

- A. The minimum wage rates to be used for this Contract are shown on the schedules on the following pages. The rates shown on these schedules are the minimum to be paid during the life of the Contract. It is, therefore, the responsibility of bidders to inform themselves as to the local labor conditions such as the length of the work day and work week, overtime compensation, health and welfare contributions, labor supply and prospective changes or adjustment of rates. In the event of conflict between the schedules for any classifications, the greater amount for the classification shall prevail as the minimum wage rate.
- B. If the Contractor finds it necessary during the progress of the work to secure a minimum wage rate for some additional classification, he shall make a request for such additional classification to the Authority, who in turn will obtain the additional classification and corresponding minimum wage rate from the State Department of Labor and Industries and advise the Contractor of the same. These additional classifications and minimum wage rates are then to be considered a part of the Contract, and the Contractor shall have no claim for additional compensation because of the additional classification and minimum wage rates.
- C. Where a question arises as to the classification in the schedule of the Department of Labor and Industries in which any employee is to be included, the decision is to be made by the State Department of Labor and Industries, through their duly authorized representative.
- D. Within three days from the date of the first advertisement or call for bids, two or more employers of labor, or two or more members of a labor organization, or the awarding officer or official, or five or more residents of the town or towns where the public works are to be constructed, may appeal to the associate commissioners for a wage determination, or a classification of employment as made by the Commissioner, by serving on the Commissioner a written notice to that effect. Thereupon the Commissioner shall immediately cause the associate commissioners to hold a public hearing on the Commissioner's action appealed from. The associate commissioners shall render their decision not later than three (3) days after the closing of the hearing. The decision of a majority of the associate commissioners shall be final, and notice thereof shall be given forthwith to the awarding official or public body. (Section 27A, Chapter 149, General Laws, Commonwealth of Massachusetts).
- E. Payments by employers to health and welfare plans under collective bargaining agreements or understandings between organized labor and employers shall be included for the purpose of establishing minimum wage rates as herein provided, (Section 26, Chapter 149, General Laws, Commonwealth of Massachusetts).
- F. The aforesaid rates of wages in the schedule of wage rates shall include payments by employers to health and welfare plans as provided in the previous section, and such payments shall be considered as payments to persons under this section performing work as herein provided. Any employer engaged in the construction of such works who does not make payments to health and welfare plan where such payments are included in said rates of wages shall pay the amount of said payments directly to each employee engaged in said construction. (Section 27, Chapter 149, General Laws, as amended).
- G. The Contractor's attention is directed to further minimum wage provisions under Paragraph 3 of the Supplementary Conditions. In cases of conflict, the higher rate shall apply.



**THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS**

Prevailing Wage Rates

**As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H**

RONALD L. WALKER, II
Secretary
WILLIAM D MCKINNEY
Director

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

Awarding Authority: MBTA
Contract Number: R20CN01 **City/Town:** NEWTON
Description of Work: Riverside Carhouse - Construct 4 work platforms (with associated structural supports, fire protection, lighting, power and compressed air), toilet room renovations, HPCU room ventilation & other work
Job Location: 325 Grove Street

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **If an apprentice rate is not listed on the prevailing wage schedule for the trade in which an apprentice is registered with the DAS, the apprentice must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2015	\$32.75	\$9.91	\$9.33	\$0.00	\$51.99
	08/01/2015	\$32.75	\$10.41	\$9.33	\$0.00	\$52.49
	12/01/2015	\$32.75	\$10.41	\$10.08	\$0.00	\$53.24
	06/01/2016	\$33.25	\$10.41	\$10.08	\$0.00	\$53.74
	08/01/2016	\$33.25	\$10.91	\$10.08	\$0.00	\$54.24
	12/01/2016	\$33.25	\$10.91	\$10.89	\$0.00	\$55.05
(3 AXLE) DRIVER - EQUIPMENT TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2015	\$32.82	\$9.91	\$9.33	\$0.00	\$52.06
	08/01/2015	\$32.82	\$10.41	\$9.33	\$0.00	\$52.56
	12/01/2015	\$32.82	\$10.41	\$10.08	\$0.00	\$53.31
	06/01/2016	\$33.32	\$10.41	\$10.08	\$0.00	\$53.81
	08/01/2016	\$33.32	\$10.91	\$10.08	\$0.00	\$54.31
	12/01/2016	\$33.32	\$10.91	\$10.89	\$0.00	\$55.12
(4 & 5 AXLE) DRIVER - EQUIPMENT TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2015	\$32.94	\$9.91	\$9.33	\$0.00	\$52.18
	08/01/2015	\$32.94	\$10.41	\$9.33	\$0.00	\$52.68
	12/01/2015	\$32.94	\$10.41	\$10.08	\$0.00	\$53.43
	06/01/2016	\$33.44	\$10.41	\$10.08	\$0.00	\$53.93
	08/01/2016	\$33.44	\$10.91	\$10.08	\$0.00	\$54.43
	12/01/2016	\$33.44	\$10.91	\$10.89	\$0.00	\$55.24
ADS/SUBMERSIBLE PILOT PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2014	\$87.36	\$9.80	\$18.17	\$0.00	\$115.33
	08/01/2015	\$90.51	\$9.80	\$18.17	\$0.00	\$118.48
AIR TRACK OPERATOR LABORERS - ZONE 1	06/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
	12/01/2015	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
	06/01/2016	\$37.35	\$7.30	\$13.20	\$0.00	\$57.85
	12/01/2016	\$38.35	\$7.30	\$13.20	\$0.00	\$58.85
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. HEAT & FROST INSULATORS LOCAL 6 (BOSTON)	06/01/2015	\$33.43	\$10.40	\$5.95	\$0.00	\$49.78
	12/01/2015	\$34.38	\$10.40	\$5.95	\$0.00	\$50.73
ASPHALT RAKER LABORERS - ZONE 1	06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
	12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
	06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
	12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE OPERATING ENGINEERS LOCAL 4	06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
	12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
	06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
	12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
	06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
	12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER OPERATING ENGINEERS LOCAL 4	06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
	12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
	06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
	12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
	06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
	12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63

Classification

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

BARCO-TYPE JUMPING TAMPER

LABORERS - ZONE 1

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

BLOCK PAVER, RAMMER / CURB SETTER

LABORERS - ZONE 1

06/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
12/01/2015	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
06/01/2016	\$37.35	\$7.30	\$13.20	\$0.00	\$57.85
12/01/2016	\$38.35	\$7.30	\$13.20	\$0.00	\$58.85

For apprentice rates see "Apprentice- LABORER"

BOILER MAKER

BOILERMAKERS LOCAL 29

01/01/2010	\$37.70	\$6.97	\$11.18	\$0.00	\$55.85
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Apprentice - BOILERMAKER - Local 29

Effective Date - 01/01/2010

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$24.51	\$6.97	\$11.18	\$0.00	\$42.66
2	65	\$24.51	\$6.97	\$11.18	\$0.00	\$42.66
3	70	\$26.39	\$6.97	\$11.18	\$0.00	\$44.54
4	75	\$28.28	\$6.97	\$11.18	\$0.00	\$46.43
5	80	\$30.16	\$6.97	\$11.18	\$0.00	\$48.31
6	85	\$32.05	\$6.97	\$11.18	\$0.00	\$50.20
7	90	\$33.93	\$6.97	\$11.18	\$0.00	\$52.08
8	95	\$35.82	\$6.97	\$11.18	\$0.00	\$53.97

Notes:**Apprentice to Journeyworker Ratio:1:5****BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY
WATERPROOFING)**

BRICKLAYERS LOCAL 3 (NEWTON)

02/01/2015	\$48.96	\$10.18	\$18.50	\$0.00	\$77.64
08/01/2015	\$49.86	\$10.18	\$18.57	\$0.00	\$78.61
02/01/2016	\$50.43	\$10.18	\$18.57	\$0.00	\$79.18
08/01/2016	\$51.33	\$10.18	\$18.65	\$0.00	\$80.16
02/01/2017	\$51.90	\$10.18	\$18.65	\$0.00	\$80.73

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Newton

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.48	\$10.18	\$18.50	\$0.00	\$53.16
2	60	\$29.38	\$10.18	\$18.50	\$0.00	\$58.06
3	70	\$34.27	\$10.18	\$18.50	\$0.00	\$62.95
4	80	\$39.17	\$10.18	\$18.50	\$0.00	\$67.85
5	90	\$44.06	\$10.18	\$18.50	\$0.00	\$72.74

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.93	\$10.18	\$18.57	\$0.00	\$53.68
2	60	\$29.92	\$10.18	\$18.57	\$0.00	\$58.67
3	70	\$34.90	\$10.18	\$18.57	\$0.00	\$63.65
4	80	\$39.89	\$10.18	\$18.57	\$0.00	\$68.64
5	90	\$44.87	\$10.18	\$18.57	\$0.00	\$73.62

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER
OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN
LABORERS - FOUNDATION AND MARINE

06/01/2015	\$36.20	\$7.30	\$13.40	\$0.00	\$56.90
12/01/2015	\$36.95	\$7.30	\$13.40	\$0.00	\$57.65
06/01/2016	\$37.70	\$7.30	\$13.40	\$0.00	\$58.40
12/01/2016	\$38.70	\$7.30	\$13.40	\$0.00	\$59.40

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING LABORER
LABORERS - FOUNDATION AND MARINE

06/01/2015	\$35.05	\$7.30	\$13.40	\$0.00	\$55.75
12/01/2015	\$35.80	\$7.30	\$13.40	\$0.00	\$56.50
06/01/2016	\$36.55	\$7.30	\$13.40	\$0.00	\$57.25
12/01/2016	\$37.55	\$7.30	\$13.40	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING TOP MAN
LABORERS - FOUNDATION AND MARINE

06/01/2015	\$35.05	\$7.30	\$13.40	\$0.00	\$55.75
12/01/2015	\$35.80	\$7.30	\$13.40	\$0.00	\$56.50
06/01/2016	\$36.55	\$7.30	\$13.40	\$0.00	\$57.25
12/01/2016	\$37.55	\$7.30	\$13.40	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

Classification**CARBIDE CORE DRILL OPERATOR**

LABORERS - ZONE 1

Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

CARPENTER

CARPENTERS -ZONE 2 (Eastern Massachusetts)

03/01/2015	\$35.75	\$9.80	\$16.48	\$0.00	\$62.03
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Apprentice - CARPENTER - Zone 2 Eastern MA**Effective Date - 03/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$17.88	\$9.80	\$1.63	\$0.00	\$29.31
2	60	\$21.45	\$9.80	\$1.63	\$0.00	\$32.88
3	70	\$25.03	\$9.80	\$11.59	\$0.00	\$46.42
4	75	\$26.81	\$9.80	\$11.59	\$0.00	\$48.20
5	80	\$28.60	\$9.80	\$13.22	\$0.00	\$51.62
6	80	\$28.60	\$9.80	\$13.22	\$0.00	\$51.62
7	90	\$32.18	\$9.80	\$14.85	\$0.00	\$56.83
8	90	\$32.18	\$9.80	\$14.85	\$0.00	\$56.83

Notes:**Apprentice to Journeyworker Ratio:1:5****CEMENT MASONRY/PLASTERING**

BRICKLAYERS LOCAL 3 (NEWTON)

01/01/2015	\$44.90	\$10.90	\$18.71	\$1.30	\$75.81
07/01/2015	\$45.82	\$10.90	\$18.71	\$1.30	\$76.73
01/01/2016	\$46.44	\$10.90	\$18.71	\$1.30	\$77.35

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Newton)

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.45	\$10.90	\$12.21	\$0.00	\$45.56
2	60	\$26.94	\$10.90	\$13.71	\$1.30	\$52.85
3	65	\$29.19	\$10.90	\$14.71	\$1.30	\$56.10
4	70	\$31.43	\$10.90	\$15.71	\$1.30	\$59.34
5	75	\$33.68	\$10.90	\$16.71	\$1.30	\$62.59
6	80	\$35.92	\$10.90	\$17.71	\$1.30	\$65.83
7	90	\$40.41	\$10.90	\$18.71	\$1.30	\$71.32

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.91	\$10.90	\$12.21	\$0.00	\$46.02
2	60	\$27.49	\$10.90	\$13.71	\$1.30	\$53.40
3	65	\$29.78	\$10.90	\$14.71	\$1.30	\$56.69
4	70	\$32.07	\$10.90	\$15.71	\$1.30	\$59.98
5	75	\$34.37	\$10.90	\$16.71	\$1.30	\$63.28
6	80	\$36.66	\$10.90	\$17.71	\$1.30	\$66.57
7	90	\$41.24	\$10.90	\$18.71	\$1.30	\$72.15

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR	06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
LABORERS - ZONE 1	12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
	06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
	12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	06/01/2015	\$43.83	\$10.00	\$14.55	\$0.00	\$68.38
OPERATING ENGINEERS LOCAL 4	12/01/2015	\$45.08	\$10.00	\$14.55	\$0.00	\$69.63
	06/01/2016	\$45.83	\$10.00	\$14.55	\$0.00	\$70.38
	12/01/2016	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
	06/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63
	12/01/2017	\$49.08	\$10.00	\$14.55	\$0.00	\$73.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

COMPRESSOR OPERATOR	06/01/2015	\$29.61	\$10.00	\$14.55	\$0.00	\$54.16
OPERATING ENGINEERS LOCAL 4	12/01/2015	\$30.48	\$10.00	\$14.55	\$0.00	\$55.03
	06/01/2016	\$31.00	\$10.00	\$14.55	\$0.00	\$55.55
	12/01/2016	\$31.87	\$10.00	\$14.55	\$0.00	\$56.42
	06/01/2017	\$32.56	\$10.00	\$14.55	\$0.00	\$57.11
	12/01/2017	\$33.25	\$10.00	\$14.55	\$0.00	\$57.80

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DELEADER (BRIDGE)	01/01/2015	\$47.66	\$7.85	\$16.10	\$0.00	\$71.61
PAINTERS LOCAL 35 - ZONE 2	07/01/2015	\$48.56	\$7.85	\$16.10	\$0.00	\$72.51
	01/01/2016	\$49.51	\$7.85	\$16.10	\$0.00	\$73.46
	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.83	\$7.85	\$0.00	\$0.00	\$31.68
2	55	\$26.21	\$7.85	\$3.66	\$0.00	\$37.72
3	60	\$28.60	\$7.85	\$3.99	\$0.00	\$40.44
4	65	\$30.98	\$7.85	\$4.32	\$0.00	\$43.15
5	70	\$33.36	\$7.85	\$14.11	\$0.00	\$55.32
6	75	\$35.75	\$7.85	\$14.44	\$0.00	\$58.04
7	80	\$38.13	\$7.85	\$14.77	\$0.00	\$60.75
8	90	\$42.89	\$7.85	\$15.44	\$0.00	\$66.18

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.28	\$7.85	\$0.00	\$0.00	\$32.13
2	55	\$26.71	\$7.85	\$3.66	\$0.00	\$38.22
3	60	\$29.14	\$7.85	\$3.99	\$0.00	\$40.98
4	65	\$31.56	\$7.85	\$4.32	\$0.00	\$43.73
5	70	\$33.99	\$7.85	\$14.11	\$0.00	\$55.95
6	75	\$36.42	\$7.85	\$14.44	\$0.00	\$58.71
7	80	\$38.85	\$7.85	\$14.77	\$0.00	\$61.47
8	90	\$43.70	\$7.85	\$15.44	\$0.00	\$66.99

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN	06/01/2015	\$35.25	\$7.30	\$13.20	\$0.00	\$55.75
LABORERS - ZONE 1	12/01/2015	\$36.00	\$7.30	\$13.20	\$0.00	\$56.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR	06/01/2015	\$36.25	\$7.30	\$13.20	\$0.00	\$56.75
LABORERS - ZONE 1	12/01/2015	\$37.00	\$7.30	\$13.20	\$0.00	\$57.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS	06/01/2015	\$36.00	\$7.30	\$13.20	\$0.00	\$56.50
LABORERS - ZONE 1	12/01/2015	\$36.75	\$7.30	\$13.20	\$0.00	\$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER	06/01/2015	\$36.25	\$7.30	\$13.20	\$0.00	\$56.75
LABORERS - ZONE 1	12/01/2015	\$37.00	\$7.30	\$13.20	\$0.00	\$57.50
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 1	06/01/2015	\$36.00	\$7.30	\$13.20	\$0.00	\$56.50
	12/01/2015	\$36.75	\$7.30	\$13.20	\$0.00	\$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER LABORERS - ZONE 1	06/01/2015	\$35.25	\$7.30	\$13.20	\$0.00	\$55.75
	12/01/2015	\$36.00	\$7.30	\$13.20	\$0.00	\$56.50
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR OPERATING ENGINEERS LOCAL 4	06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
	12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
	06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
	12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
	06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
	12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2014	\$58.24	\$9.80	\$18.17	\$0.00	\$86.21
	08/01/2015	\$60.34	\$9.80	\$18.17	\$0.00	\$88.31
DIVER TENDER PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2014	\$41.60	\$9.80	\$18.17	\$0.00	\$69.57
	08/01/2015	\$43.10	\$9.80	\$18.17	\$0.00	\$71.07
DIVER TENDER (EFFLUENT) PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2014	\$62.40	\$9.80	\$18.17	\$0.00	\$90.37
	08/01/2015	\$64.65	\$9.80	\$18.17	\$0.00	\$92.62
DIVER/SLURRY (EFFLUENT) PILE DRIVER LOCAL 56 (ZONE 1)	08/01/2014	\$87.36	\$9.80	\$18.17	\$0.00	\$115.33
	08/01/2015	\$90.51	\$9.80	\$18.17	\$0.00	\$118.48
DRAWBRIDGE OPERATOR (Construction) ELECTRICIANS LOCAL 103	03/01/2015	\$45.17	\$13.00	\$15.40	\$0.00	\$73.57
	09/01/2015	\$46.13	\$13.00	\$15.43	\$0.00	\$74.56
	03/01/2016	\$47.08	\$13.00	\$15.46	\$0.00	\$75.54
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN ELECTRICIANS LOCAL 103	03/01/2015	\$45.17	\$13.00	\$15.40	\$0.00	\$73.57
	09/01/2015	\$46.13	\$13.00	\$15.43	\$0.00	\$74.56
	03/01/2016	\$47.08	\$13.00	\$15.46	\$0.00	\$75.54

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total RateApprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.07	\$13.00	\$0.54	\$0.00	\$31.61
2	40	\$18.07	\$13.00	\$0.54	\$0.00	\$31.61
3	45	\$20.33	\$13.00	\$11.64	\$0.00	\$44.97
4	45	\$20.33	\$13.00	\$11.64	\$0.00	\$44.97
5	50	\$22.59	\$13.00	\$11.98	\$0.00	\$47.57
6	55	\$24.84	\$13.00	\$12.33	\$0.00	\$50.17
7	60	\$27.10	\$13.00	\$12.66	\$0.00	\$52.76
8	65	\$29.36	\$13.00	\$13.01	\$0.00	\$55.37
9	70	\$31.62	\$13.00	\$13.35	\$0.00	\$57.97
10	75	\$33.88	\$13.00	\$13.70	\$0.00	\$60.58

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.45	\$13.00	\$0.55	\$0.00	\$32.00
2	40	\$18.45	\$13.00	\$0.55	\$0.00	\$32.00
3	45	\$20.76	\$13.00	\$11.65	\$0.00	\$45.41
4	45	\$20.76	\$13.00	\$11.65	\$0.00	\$45.41
5	50	\$23.07	\$13.00	\$11.99	\$0.00	\$48.06
6	55	\$25.37	\$13.00	\$12.34	\$0.00	\$50.71
7	60	\$27.68	\$13.00	\$12.68	\$0.00	\$53.36
8	65	\$29.98	\$13.00	\$13.03	\$0.00	\$56.01
9	70	\$32.29	\$13.00	\$13.37	\$0.00	\$58.66
10	75	\$34.60	\$13.00	\$13.72	\$0.00	\$61.32

Notes :

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR	01/01/2015	\$53.30	\$13.58	\$14.21	\$0.00	\$81.09
ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2016	\$54.53	\$14.43	\$14.96	\$0.00	\$83.92
	01/01/2017	\$55.86	\$15.28	\$15.71	\$0.00	\$86.85

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - ELEVATOR CONSTRUCTOR - Local 4**Effective Date - 01/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.65	\$13.58	\$0.00	\$0.00	\$40.23
2	55	\$29.32	\$13.58	\$14.21	\$0.00	\$57.11
3	65	\$34.65	\$13.58	\$14.21	\$0.00	\$62.44
4	70	\$37.31	\$13.58	\$14.21	\$0.00	\$65.10
5	80	\$42.64	\$13.58	\$14.21	\$0.00	\$70.43

Effective Date - 01/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.27	\$14.43	\$0.00	\$0.00	\$41.70
2	55	\$29.99	\$14.43	\$14.96	\$0.00	\$59.38
3	65	\$35.44	\$14.43	\$14.96	\$0.00	\$64.83
4	70	\$38.17	\$14.43	\$14.96	\$0.00	\$67.56
5	80	\$43.62	\$14.43	\$14.96	\$0.00	\$73.01

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1**ELEVATOR CONSTRUCTOR HELPER***ELEVATOR CONSTRUCTORS LOCAL 4*

01/01/2015	\$37.31	\$13.58	\$14.21	\$0.00	\$65.10
01/01/2016	\$38.17	\$14.43	\$14.96	\$0.00	\$67.56
01/01/2017	\$39.10	\$15.28	\$15.71	\$0.00	\$70.09

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR*LABORERS - ZONE 1*

06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY*OPERATING ENGINEERS LOCAL 4*

05/01/2015	\$40.22	\$10.00	\$14.30	\$0.00	\$64.52
11/01/2015	\$40.80	\$10.00	\$14.30	\$0.00	\$65.10
05/01/2016	\$41.69	\$10.00	\$14.30	\$0.00	\$65.99
11/01/2016	\$42.28	\$10.00	\$14.30	\$0.00	\$66.58
05/01/2017	\$43.16	\$10.00	\$14.30	\$0.00	\$67.46
11/01/2017	\$43.89	\$10.00	\$14.30	\$0.00	\$68.19
05/01/2018	\$44.60	\$10.00	\$14.30	\$0.00	\$68.90

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY*OPERATING ENGINEERS LOCAL 4*

05/01/2015	\$41.65	\$10.00	\$14.30	\$0.00	\$65.95
11/01/2015	\$42.24	\$10.00	\$14.30	\$0.00	\$66.54
05/01/2016	\$43.13	\$10.00	\$14.30	\$0.00	\$67.43
11/01/2016	\$43.73	\$10.00	\$14.30	\$0.00	\$68.03
05/01/2017	\$44.62	\$10.00	\$14.30	\$0.00	\$68.92
11/01/2017	\$45.35	\$10.00	\$14.30	\$0.00	\$69.65
05/01/2018	\$46.07	\$10.00	\$14.30	\$0.00	\$70.37

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY OPERATING ENGINEERS LOCAL 4	05/01/2015	\$21.68	\$10.00	\$14.30	\$0.00	\$45.98
	11/01/2015	\$22.02	\$10.00	\$14.30	\$0.00	\$46.32
	05/01/2016	\$22.54	\$10.00	\$14.30	\$0.00	\$46.84
	11/01/2016	\$22.89	\$10.00	\$14.30	\$0.00	\$47.19
	05/01/2017	\$23.42	\$10.00	\$14.30	\$0.00	\$47.72
	11/01/2017	\$23.84	\$10.00	\$14.30	\$0.00	\$48.14
	05/01/2018	\$24.27	\$10.00	\$14.30	\$0.00	\$48.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER ELECTRICIANS LOCAL 103	03/01/2015	\$45.17	\$13.00	\$15.40	\$0.00	\$73.57
	09/01/2015	\$46.13	\$13.00	\$15.43	\$0.00	\$74.56
	03/01/2016	\$47.08	\$13.00	\$15.46	\$0.00	\$75.54
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONINGELECTRICIANS LOCAL 103	03/01/2015	\$33.88	\$13.00	\$13.70	\$0.00	\$60.58
	09/01/2015	\$34.60	\$13.00	\$13.72	\$0.00	\$61.32
	03/01/2016	\$35.31	\$13.00	\$13.74	\$0.00	\$62.05
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) OPERATING ENGINEERS LOCAL 4	06/01/2015	\$35.64	\$10.00	\$14.55	\$0.00	\$60.19
	12/01/2015	\$36.69	\$10.00	\$14.55	\$0.00	\$61.24
	06/01/2016	\$37.31	\$10.00	\$14.55	\$0.00	\$61.86
	12/01/2016	\$38.35	\$10.00	\$14.55	\$0.00	\$62.90
	06/01/2017	\$39.19	\$10.00	\$14.55	\$0.00	\$63.74
	12/01/2017	\$40.02	\$10.00	\$14.55	\$0.00	\$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GER & SIGNALER LABORERS - ZONE 1	06/01/2015	\$20.50	\$7.30	\$13.20	\$0.00	\$41.00
	12/01/2015	\$20.50	\$7.30	\$13.20	\$0.00	\$41.00
	06/01/2016	\$20.50	\$7.30	\$13.20	\$0.00	\$41.00
	12/01/2016	\$20.50	\$7.30	\$13.20	\$0.00	\$41.00
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER FLOORCOVERERS LOCAL 2168 ZONE 1	09/01/2014	\$40.40	\$9.80	\$17.21	\$0.00	\$67.41

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - FLOORCOVERER - Local 2168 Zone I

Effective Date - 09/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.20	\$9.80	\$1.79	\$0.00	\$31.79
2	55	\$22.22	\$9.80	\$1.79	\$0.00	\$33.81
3	60	\$24.24	\$9.80	\$11.84	\$0.00	\$45.88
4	65	\$26.26	\$9.80	\$11.84	\$0.00	\$47.90
5	70	\$28.28	\$9.80	\$13.63	\$0.00	\$51.71
6	75	\$30.30	\$9.80	\$13.63	\$0.00	\$53.73
7	80	\$32.32	\$9.80	\$15.42	\$0.00	\$57.54
8	85	\$34.34	\$9.80	\$15.42	\$0.00	\$59.56

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GENERATOR/LIGHTING PLANT/HEATERS

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$29.61	\$10.00	\$14.55	\$0.00	\$54.16
12/01/2015	\$30.48	\$10.00	\$14.55	\$0.00	\$55.03
06/01/2016	\$31.00	\$10.00	\$14.55	\$0.00	\$55.55
12/01/2016	\$31.87	\$10.00	\$14.55	\$0.00	\$56.42
06/01/2017	\$32.56	\$10.00	\$14.55	\$0.00	\$57.11
12/01/2017	\$33.25	\$10.00	\$14.55	\$0.00	\$57.80

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR
SYSTEMS)

GLAZIERS LOCAL 35 (ZONE 2)

01/01/2015	\$37.16	\$7.85	\$16.10	\$0.00	\$61.11
07/01/2015	\$38.06	\$7.85	\$16.10	\$0.00	\$62.01
01/01/2016	\$39.01	\$7.85	\$16.10	\$0.00	\$62.96
07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

Apprentice - GLAZIER - Local 35 Zone 2

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.58	\$7.85	\$0.00	\$0.00	\$26.43
2	55	\$20.44	\$7.85	\$3.66	\$0.00	\$31.95
3	60	\$22.30	\$7.85	\$3.99	\$0.00	\$34.14
4	65	\$24.15	\$7.85	\$4.32	\$0.00	\$36.32
5	70	\$26.01	\$7.85	\$14.11	\$0.00	\$47.97
6	75	\$27.87	\$7.85	\$14.44	\$0.00	\$50.16
7	80	\$29.73	\$7.85	\$14.77	\$0.00	\$52.35
8	90	\$33.44	\$7.85	\$15.44	\$0.00	\$56.73

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.03	\$7.85	\$0.00	\$0.00	\$26.88
2	55	\$20.93	\$7.85	\$3.66	\$0.00	\$32.44
3	60	\$22.84	\$7.85	\$3.99	\$0.00	\$34.68
4	65	\$24.74	\$7.85	\$4.32	\$0.00	\$36.91
5	70	\$26.64	\$7.85	\$14.11	\$0.00	\$48.60
6	75	\$28.55	\$7.85	\$14.44	\$0.00	\$50.84
7	80	\$30.45	\$7.85	\$14.77	\$0.00	\$53.07
8	90	\$34.25	\$7.85	\$15.44	\$0.00	\$57.54

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS	06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
OPERATING ENGINEERS LOCAL 4	12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
	06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
	12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
	06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
	12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - OPERATING ENGINEERS - Local 4

Effective Date - 06/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$23.56	\$10.00	\$0.00	\$0.00	\$33.56
2	60	\$25.70	\$10.00	\$14.55	\$0.00	\$50.25
3	65	\$27.84	\$10.00	\$14.55	\$0.00	\$52.39
4	70	\$29.98	\$10.00	\$14.55	\$0.00	\$54.53
5	75	\$32.12	\$10.00	\$14.55	\$0.00	\$56.67
6	80	\$34.26	\$10.00	\$14.55	\$0.00	\$58.81
7	85	\$36.41	\$10.00	\$14.55	\$0.00	\$60.96
8	90	\$38.55	\$10.00	\$14.55	\$0.00	\$63.10

Effective Date - 12/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.24	\$10.00	\$0.00	\$0.00	\$34.24
2	60	\$26.45	\$10.00	\$14.55	\$0.00	\$51.00
3	65	\$28.65	\$10.00	\$14.55	\$0.00	\$53.20
4	70	\$30.86	\$10.00	\$14.55	\$0.00	\$55.41
5	75	\$33.06	\$10.00	\$14.55	\$0.00	\$57.61
6	80	\$35.26	\$10.00	\$14.55	\$0.00	\$59.81
7	85	\$37.47	\$10.00	\$14.55	\$0.00	\$62.02
8	90	\$39.67	\$10.00	\$14.55	\$0.00	\$64.22

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK)

SHEETMETAL WORKERS LOCAL 17 - A

02/01/2015	\$43.28	\$10.20	\$20.54	\$2.22	\$76.24
08/01/2015	\$44.28	\$10.20	\$20.54	\$2.22	\$77.24
02/01/2016	\$45.28	\$10.20	\$20.54	\$2.22	\$78.24
08/01/2016	\$46.43	\$10.20	\$20.54	\$2.22	\$79.39
02/01/2017	\$47.53	\$10.20	\$20.54	\$2.22	\$80.49
08/01/2017	\$48.63	\$10.20	\$20.54	\$2.22	\$81.59
02/01/2018	\$49.78	\$10.20	\$20.54	\$2.22	\$82.74

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS)

ELECTRICIANS LOCAL 103

03/01/2015	\$45.17	\$13.00	\$15.40	\$0.00	\$73.57
09/01/2015	\$46.13	\$13.00	\$15.43	\$0.00	\$74.56
03/01/2016	\$47.08	\$13.00	\$15.46	\$0.00	\$75.54

For apprentice rates see "Apprentice- ELECTRICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - A	02/01/2015	\$43.28	\$10.20	\$20.54	\$2.22	\$76.24
	08/01/2015	\$44.28	\$10.20	\$20.54	\$2.22	\$77.24
	02/01/2016	\$45.28	\$10.20	\$20.54	\$2.22	\$78.24
	08/01/2016	\$46.43	\$10.20	\$20.54	\$2.22	\$79.39
	02/01/2017	\$47.53	\$10.20	\$20.54	\$2.22	\$80.49
	08/01/2017	\$48.63	\$10.20	\$20.54	\$2.22	\$81.59
	02/01/2018	\$49.78	\$10.20	\$20.54	\$2.22	\$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING - WATER) PIPEFITTERS LOCAL 537	03/01/2015	\$48.69	\$9.70	\$16.89	\$0.00	\$75.28
	09/01/2015	\$49.69	\$9.70	\$16.89	\$0.00	\$76.28
	03/01/2016	\$50.69	\$9.70	\$16.89	\$0.00	\$77.28
	09/01/2016	\$51.69	\$9.70	\$16.89	\$0.00	\$78.28
	03/01/2017	\$52.69	\$9.70	\$16.89	\$0.00	\$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC PIPEFITTERS LOCAL 537	03/01/2015	\$48.69	\$9.70	\$16.89	\$0.00	\$75.28
	09/01/2015	\$49.69	\$9.70	\$16.89	\$0.00	\$76.28
	03/01/2016	\$50.69	\$9.70	\$16.89	\$0.00	\$77.28
	09/01/2016	\$51.69	\$9.70	\$16.89	\$0.00	\$78.28
	03/01/2017	\$52.69	\$9.70	\$16.89	\$0.00	\$79.28
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS LABORERS - ZONE 1	06/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
	12/01/2015	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
	06/01/2016	\$37.35	\$7.30	\$13.20	\$0.00	\$57.85
	12/01/2016	\$38.35	\$7.30	\$13.20	\$0.00	\$58.85
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) HEAT & FROST INSULATORS LOCAL 6 (BOSTON)	09/01/2014	\$43.31	\$11.25	\$12.60	\$0.00	\$67.16

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston

Effective Date - 09/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.66	\$11.25	\$9.35	\$0.00	\$42.26
2	60	\$25.99	\$11.25	\$10.00	\$0.00	\$47.24
3	70	\$30.32	\$11.25	\$10.65	\$0.00	\$52.22
4	80	\$34.65	\$11.25	\$11.30	\$0.00	\$57.20

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER IRONWORKERS LOCAL 7 (BOSTON AREA)	03/16/2015	\$42.11	\$7.70	\$20.25	\$0.00	\$70.06
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Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - IRONWORKER - Local 7 Boston

Effective Date - 03/16/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$25.27	\$7.70	\$20.25	\$0.00	\$53.22
2	70	\$29.48	\$7.70	\$20.25	\$0.00	\$57.43
3	75	\$31.58	\$7.70	\$20.25	\$0.00	\$59.53
4	80	\$33.69	\$7.70	\$20.25	\$0.00	\$61.64
5	85	\$35.79	\$7.70	\$20.25	\$0.00	\$63.74
6	90	\$37.90	\$7.70	\$20.25	\$0.00	\$65.85

Notes:

** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR

LABORERS - ZONE 1

06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

LABORER

LABORERS - ZONE 1

06/01/2015	\$35.10	\$7.30	\$13.20	\$0.00	\$55.60
12/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
06/01/2016	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
12/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10

Apprentice - LABORER - Zone 1

Effective Date - 06/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.06	\$7.30	\$13.20	\$0.00	\$41.56
2	70	\$24.57	\$7.30	\$13.20	\$0.00	\$45.07
3	80	\$28.08	\$7.30	\$13.20	\$0.00	\$48.58
4	90	\$31.59	\$7.30	\$13.20	\$0.00	\$52.09

Effective Date - 12/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.51	\$7.30	\$13.20	\$0.00	\$42.01
2	70	\$25.10	\$7.30	\$13.20	\$0.00	\$45.60
3	80	\$28.68	\$7.30	\$13.20	\$0.00	\$49.18
4	90	\$32.27	\$7.30	\$13.20	\$0.00	\$52.77

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER LABORERS - ZONE 1	06/01/2015	\$35.10	\$7.30	\$13.20	\$0.00	\$55.60
	12/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
	06/01/2016	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
	12/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER LABORERS - ZONE 1	06/01/2015	\$35.10	\$7.30	\$13.20	\$0.00	\$55.60
	12/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
	06/01/2016	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
	12/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER LABORERS - ZONE 1	06/01/2015	\$35.25	\$7.30	\$13.20	\$0.00	\$55.75
	12/01/2015	\$36.00	\$7.30	\$13.20	\$0.00	\$56.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER LABORERS - ZONE 1	06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
	12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
	06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
	12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER LABORERS - ZONE 1	06/01/2015	\$35.10	\$7.30	\$13.20	\$0.00	\$55.60
	12/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
	06/01/2016	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
	12/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER LABORERS - ZONE 1	06/01/2015	\$35.10	\$7.30	\$13.20	\$0.00	\$55.60
	12/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
	06/01/2016	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
	12/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR LABORERS - ZONE 1	06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
	12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
	06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
	12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2015	\$37.37	\$10.18	\$17.18	\$0.00	\$64.73
	08/01/2015	\$38.08	\$10.18	\$17.25	\$0.00	\$65.51
	02/01/2016	\$38.53	\$10.18	\$17.25	\$0.00	\$65.96
	08/01/2016	\$39.23	\$10.18	\$17.33	\$0.00	\$66.74
	02/01/2017	\$39.69	\$10.18	\$17.33	\$0.00	\$67.20

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.69	\$10.18	\$17.18	\$0.00	\$46.05
2	60	\$22.42	\$10.18	\$17.18	\$0.00	\$49.78
3	70	\$26.16	\$10.18	\$17.18	\$0.00	\$53.52
4	80	\$29.90	\$10.18	\$17.18	\$0.00	\$57.26
5	90	\$33.63	\$10.18	\$17.18	\$0.00	\$60.99

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.04	\$10.18	\$17.25	\$0.00	\$46.47
2	60	\$22.85	\$10.18	\$17.25	\$0.00	\$50.28
3	70	\$26.66	\$10.18	\$17.25	\$0.00	\$54.09
4	80	\$30.46	\$10.18	\$17.25	\$0.00	\$57.89
5	90	\$34.27	\$10.18	\$17.25	\$0.00	\$61.70

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS, TILELAYERS & TERRAZZO MECH
BRICKLAYERS LOCAL 3 - MARBLE & TILE

02/01/2015	\$49.00	\$10.18	\$18.50	\$0.00	\$77.68
08/01/2015	\$49.90	\$10.18	\$18.57	\$0.00	\$78.65
02/01/2016	\$50.47	\$10.18	\$18.57	\$0.00	\$79.22
08/01/2016	\$51.37	\$10.18	\$18.65	\$0.00	\$80.20
02/01/2017	\$51.94	\$10.18	\$18.65	\$0.00	\$80.77

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.50	\$10.18	\$18.50	\$0.00	\$53.18
2	60	\$29.40	\$10.18	\$18.50	\$0.00	\$58.08
3	70	\$34.30	\$10.18	\$18.50	\$0.00	\$62.98
4	80	\$39.20	\$10.18	\$18.50	\$0.00	\$67.88
5	90	\$44.10	\$10.18	\$18.50	\$0.00	\$72.78

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.95	\$10.18	\$18.57	\$0.00	\$53.70
2	60	\$29.94	\$10.18	\$18.57	\$0.00	\$58.69
3	70	\$34.93	\$10.18	\$18.57	\$0.00	\$63.68
4	80	\$39.92	\$10.18	\$18.57	\$0.00	\$68.67
5	90	\$44.91	\$10.18	\$18.57	\$0.00	\$73.66

Notes:

Apprentice to Journeyworker Ratio:1:5

CH. SWEEPER OPERATOR (ON CONST. SITES)	06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
ATING ENGINEERS LOCAL 4	12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
	06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
	12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
	06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
	12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE	06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
	06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
	12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
	06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
	12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 1)	04/01/2015	\$37.64	\$9.80	\$16.21	\$0.00	\$63.65
MILLWRIGHTS LOCAL 1121 - Zone 1						

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 1*

Effective Date - 04/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$20.70	\$9.80	\$4.48	\$0.00	\$34.98
2	65	\$24.47	\$9.80	\$13.36	\$0.00	\$47.63
3	75	\$28.23	\$9.80	\$14.18	\$0.00	\$52.21
4	85	\$31.99	\$9.80	\$14.99	\$0.00	\$56.78

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER

LABORERS - ZONE 1

06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

OILER (OTHER THAN TRUCK CRANES, GRADALLS)

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$21.97	\$10.00	\$14.55	\$0.00	\$46.52
12/01/2015	\$22.62	\$10.00	\$14.55	\$0.00	\$47.17
06/01/2016	\$23.01	\$10.00	\$14.55	\$0.00	\$47.56
12/01/2016	\$23.66	\$10.00	\$14.55	\$0.00	\$48.21
06/01/2017	\$24.17	\$10.00	\$14.55	\$0.00	\$48.72
12/01/2017	\$24.69	\$10.00	\$14.55	\$0.00	\$49.24

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OILER (TRUCK CRANES, GRADALLS)

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$25.68	\$10.00	\$14.55	\$0.00	\$50.23
12/01/2015	\$26.43	\$10.00	\$14.55	\$0.00	\$50.98
06/01/2016	\$26.89	\$10.00	\$14.55	\$0.00	\$51.44
12/01/2016	\$27.64	\$10.00	\$14.55	\$0.00	\$52.19
06/01/2017	\$28.24	\$10.00	\$14.55	\$0.00	\$52.79
12/01/2017	\$28.85	\$10.00	\$14.55	\$0.00	\$53.40

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

OTHER POWER DRIVEN EQUIPMENT - CLASS II

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PAINTER (BRIDGES/TANKS)

PAINTERS LOCAL 35 - ZONE 2

01/01/2015	\$47.66	\$7.85	\$16.10	\$0.00	\$71.61
07/01/2015	\$48.56	\$7.85	\$16.10	\$0.00	\$72.51
01/01/2016	\$49.51	\$7.85	\$16.10	\$0.00	\$73.46
07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

Apprentice - PAINTER Local 35 - BRIDGES/TANKS**Effective Date - 01/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.83	\$7.85	\$0.00	\$0.00	\$31.68
2	55	\$26.21	\$7.85	\$3.66	\$0.00	\$37.72
3	60	\$28.60	\$7.85	\$3.99	\$0.00	\$40.44
4	65	\$30.98	\$7.85	\$4.32	\$0.00	\$43.15
5	70	\$33.36	\$7.85	\$14.11	\$0.00	\$55.32
6	75	\$35.75	\$7.85	\$14.44	\$0.00	\$58.04
7	80	\$38.13	\$7.85	\$14.77	\$0.00	\$60.75
8	90	\$42.89	\$7.85	\$15.44	\$0.00	\$66.18

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.28	\$7.85	\$0.00	\$0.00	\$32.13
2	55	\$26.71	\$7.85	\$3.66	\$0.00	\$38.22
3	60	\$29.14	\$7.85	\$3.99	\$0.00	\$40.98
4	65	\$31.56	\$7.85	\$4.32	\$0.00	\$43.73
5	70	\$33.99	\$7.85	\$14.11	\$0.00	\$55.95
6	75	\$36.42	\$7.85	\$14.44	\$0.00	\$58.71
7	80	\$38.85	\$7.85	\$14.77	\$0.00	\$61.47
8	90	\$43.70	\$7.85	\$15.44	\$0.00	\$66.99

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1**PAINTER (SPRAY OR SANDBLAST, NEW) ***

* If 30% or more of surfaces to be painted are new construction,

NEW paint rate shall be used. *PAINTERS LOCAL 35 - ZONE 2*

01/01/2015	\$38.56	\$7.85	\$16.10	\$0.00	\$62.51
07/01/2015	\$39.46	\$7.85	\$16.10	\$0.00	\$63.41
01/01/2016	\$40.41	\$7.85	\$16.10	\$0.00	\$64.36
07/01/2016	\$41.36	\$7.85	\$16.10	\$0.00	\$65.31
01/01/2017	\$42.31	\$7.85	\$16.10	\$0.00	\$66.26

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.28	\$7.85	\$0.00	\$0.00	\$27.13
2	55	\$21.21	\$7.85	\$3.66	\$0.00	\$32.72
3	60	\$23.14	\$7.85	\$3.99	\$0.00	\$34.98
4	65	\$25.06	\$7.85	\$4.32	\$0.00	\$37.23
5	70	\$26.99	\$7.85	\$14.11	\$0.00	\$48.95
6	75	\$28.92	\$7.85	\$14.44	\$0.00	\$51.21
7	80	\$30.85	\$7.85	\$14.77	\$0.00	\$53.47
8	90	\$34.70	\$7.85	\$15.44	\$0.00	\$57.99

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.73	\$7.85	\$0.00	\$0.00	\$27.58
2	55	\$21.70	\$7.85	\$3.66	\$0.00	\$33.21
3	60	\$23.68	\$7.85	\$3.99	\$0.00	\$35.52
4	65	\$25.65	\$7.85	\$4.32	\$0.00	\$37.82
5	70	\$27.62	\$7.85	\$14.11	\$0.00	\$49.58
6	75	\$29.60	\$7.85	\$14.44	\$0.00	\$51.89
7	80	\$31.57	\$7.85	\$14.77	\$0.00	\$54.19
8	90	\$35.51	\$7.85	\$15.44	\$0.00	\$58.80

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2015	\$36.62	\$7.85	\$16.10	\$0.00	\$60.57
PAINTERS LOCAL 35 - ZONE 2	07/01/2015	\$37.52	\$7.85	\$16.10	\$0.00	\$61.47
	01/01/2016	\$38.47	\$7.85	\$16.10	\$0.00	\$62.42
	07/01/2016	\$39.42	\$7.85	\$16.10	\$0.00	\$63.37
	01/01/2017	\$40.37	\$7.85	\$16.10	\$0.00	\$64.32

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.31	\$7.85	\$0.00	\$0.00	\$26.16
2	55	\$20.14	\$7.85	\$3.66	\$0.00	\$31.65
3	60	\$21.97	\$7.85	\$3.99	\$0.00	\$33.81
4	65	\$23.80	\$7.85	\$4.32	\$0.00	\$35.97
5	70	\$25.63	\$7.85	\$14.11	\$0.00	\$47.59
6	75	\$27.47	\$7.85	\$14.44	\$0.00	\$49.76
7	80	\$29.30	\$7.85	\$14.77	\$0.00	\$51.92
8	90	\$32.96	\$7.85	\$15.44	\$0.00	\$56.25

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.76	\$7.85	\$0.00	\$0.00	\$26.61
2	55	\$20.64	\$7.85	\$3.66	\$0.00	\$32.15
3	60	\$22.51	\$7.85	\$3.99	\$0.00	\$34.35
4	65	\$24.39	\$7.85	\$4.32	\$0.00	\$36.56
5	70	\$26.26	\$7.85	\$14.11	\$0.00	\$48.22
6	75	\$28.14	\$7.85	\$14.44	\$0.00	\$50.43
7	80	\$30.02	\$7.85	\$14.77	\$0.00	\$52.64
8	90	\$33.77	\$7.85	\$15.44	\$0.00	\$57.06

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS)

LABORERS - ZONE 1

06/01/2015	\$35.10	\$7.30	\$13.20	\$0.00	\$55.60
12/01/2015	\$35.85	\$7.30	\$13.20	\$0.00	\$56.35
06/01/2016	\$36.60	\$7.30	\$13.20	\$0.00	\$57.10
12/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10

For Apprentice rates see "Apprentice- LABORER"

PAINTER / TAPER (BRUSH, NEW) *

* If 30% or more of surfaces to be painted are new construction,
NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2

01/01/2015	\$37.16	\$7.85	\$16.10	\$0.00	\$61.11
07/01/2015	\$38.06	\$7.85	\$16.10	\$0.00	\$62.01
01/01/2016	\$39.01	\$7.85	\$16.10	\$0.00	\$62.96
07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**Effective Date - 01/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.58	\$7.85	\$0.00	\$0.00	\$26.43
2	55	\$20.44	\$7.85	\$3.66	\$0.00	\$31.95
3	60	\$22.30	\$7.85	\$3.99	\$0.00	\$34.14
4	65	\$24.15	\$7.85	\$4.32	\$0.00	\$36.32
5	70	\$26.01	\$7.85	\$14.11	\$0.00	\$47.97
6	75	\$27.87	\$7.85	\$14.44	\$0.00	\$50.16
7	80	\$29.73	\$7.85	\$14.77	\$0.00	\$52.35
8	90	\$33.44	\$7.85	\$15.44	\$0.00	\$56.73

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.03	\$7.85	\$0.00	\$0.00	\$26.88
2	55	\$20.93	\$7.85	\$3.66	\$0.00	\$32.44
3	60	\$22.84	\$7.85	\$3.99	\$0.00	\$34.68
4	65	\$24.74	\$7.85	\$4.32	\$0.00	\$36.91
5	70	\$26.64	\$7.85	\$14.11	\$0.00	\$48.60
6	75	\$28.55	\$7.85	\$14.44	\$0.00	\$50.84
7	80	\$30.45	\$7.85	\$14.77	\$0.00	\$53.07
8	90	\$34.25	\$7.85	\$15.44	\$0.00	\$57.54

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2015	\$35.22	\$7.85	\$16.10	\$0.00	\$59.17
PAINTERS LOCAL 35 - ZONE 2	07/01/2015	\$36.12	\$7.85	\$16.10	\$0.00	\$60.07
	01/01/2016	\$37.07	\$7.85	\$16.10	\$0.00	\$61.02
	07/01/2016	\$38.02	\$7.85	\$16.10	\$0.00	\$61.97
	01/01/2017	\$38.97	\$7.85	\$16.10	\$0.00	\$62.92

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT

Effective Date - 01/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$17.61	\$7.85	\$0.00	\$0.00	\$25.46
2	55	\$19.37	\$7.85	\$3.66	\$0.00	\$30.88
3	60	\$21.13	\$7.85	\$3.99	\$0.00	\$32.97
4	65	\$22.89	\$7.85	\$4.32	\$0.00	\$35.06
5	70	\$24.65	\$7.85	\$14.11	\$0.00	\$46.61
6	75	\$26.42	\$7.85	\$14.44	\$0.00	\$48.71
7	80	\$28.18	\$7.85	\$14.77	\$0.00	\$50.80
8	90	\$31.70	\$7.85	\$15.44	\$0.00	\$54.99

Effective Date - 07/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.06	\$7.85	\$0.00	\$0.00	\$25.91
2	55	\$19.87	\$7.85	\$3.66	\$0.00	\$31.38
3	60	\$21.67	\$7.85	\$3.99	\$0.00	\$33.51
4	65	\$23.48	\$7.85	\$4.32	\$0.00	\$35.65
5	70	\$25.28	\$7.85	\$14.11	\$0.00	\$47.24
6	75	\$27.09	\$7.85	\$14.44	\$0.00	\$49.38
7	80	\$28.90	\$7.85	\$14.77	\$0.00	\$51.52
8	90	\$32.51	\$7.85	\$15.44	\$0.00	\$55.80

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER

TEAMSTERS JOINT COUNCIL NO. 10 ZONE A

06/01/2015	\$32.58	\$9.91	\$9.33	\$0.00	\$51.82
08/01/2015	\$32.58	\$10.41	\$9.33	\$0.00	\$52.32
12/01/2015	\$32.58	\$10.41	\$10.08	\$0.00	\$53.07
06/01/2016	\$33.08	\$10.41	\$10.08	\$0.00	\$53.57
08/01/2016	\$33.08	\$10.91	\$10.08	\$0.00	\$54.07
12/01/2016	\$33.08	\$10.91	\$10.89	\$0.00	\$54.88

PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)

PILE DRIVER LOCAL 56 (ZONE 1)

08/01/2014	\$41.60	\$9.80	\$18.17	\$0.00	\$69.57
08/01/2015	\$43.10	\$9.80	\$18.17	\$0.00	\$71.07

PILE DRIVER

PILE DRIVER LOCAL 56 (ZONE 1)

08/01/2014	\$41.60	\$9.80	\$18.17	\$0.00	\$69.57
08/01/2015	\$43.10	\$9.80	\$18.17	\$0.00	\$71.07

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - PILE DRIVER - Local 56 Zone 1

Effective Date - 08/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.80	\$9.80	\$18.17	\$0.00	\$48.77
2	60	\$24.96	\$9.80	\$18.17	\$0.00	\$52.93
3	70	\$29.12	\$9.80	\$18.17	\$0.00	\$57.09
4	75	\$31.20	\$9.80	\$18.17	\$0.00	\$59.17
5	80	\$33.28	\$9.80	\$18.17	\$0.00	\$61.25
6	80	\$33.28	\$9.80	\$18.17	\$0.00	\$61.25
7	90	\$37.44	\$9.80	\$18.17	\$0.00	\$65.41
8	90	\$37.44	\$9.80	\$18.17	\$0.00	\$65.41

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.55	\$9.80	\$18.17	\$0.00	\$49.52
2	60	\$25.86	\$9.80	\$18.17	\$0.00	\$53.83
3	70	\$30.17	\$9.80	\$18.17	\$0.00	\$58.14
4	75	\$32.33	\$9.80	\$18.17	\$0.00	\$60.30
5	80	\$34.48	\$9.80	\$18.17	\$0.00	\$62.45
6	80	\$34.48	\$9.80	\$18.17	\$0.00	\$62.45
7	90	\$38.79	\$9.80	\$18.17	\$0.00	\$66.76
8	90	\$38.79	\$9.80	\$18.17	\$0.00	\$66.76

Notes:

Apprentice to Journeyworker Ratio:1:3

PIPEFITTER & STEAMFITTER

PIPEFITTERS LOCAL 537

03/01/2015	\$48.69	\$9.70	\$16.89	\$0.00	\$75.28
09/01/2015	\$49.69	\$9.70	\$16.89	\$0.00	\$76.28
03/01/2016	\$50.69	\$9.70	\$16.89	\$0.00	\$77.28
09/01/2016	\$51.69	\$9.70	\$16.89	\$0.00	\$78.28
03/01/2017	\$52.69	\$9.70	\$16.89	\$0.00	\$79.28

Classification

Effective Date

Base Wage

Health

Pension

Supplemental
Unemployment

Total Rate

Apprentice - PIPEFITTER - Local 537

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.48	\$9.70	\$7.50	\$0.00	\$36.68
2	45	\$21.91	\$9.70	\$16.89	\$0.00	\$48.50
3	60	\$29.21	\$9.70	\$16.89	\$0.00	\$55.80
4	70	\$34.08	\$9.70	\$16.89	\$0.00	\$60.67
5	80	\$38.95	\$9.70	\$16.89	\$0.00	\$65.54

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.88	\$9.70	\$7.50	\$0.00	\$37.08
2	45	\$22.36	\$9.70	\$16.89	\$0.00	\$48.95
3	60	\$29.81	\$9.70	\$16.89	\$0.00	\$56.40
4	70	\$34.78	\$9.70	\$16.89	\$0.00	\$61.37
5	80	\$39.75	\$9.70	\$16.89	\$0.00	\$66.34

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.

Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

LABORER	06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
LABORERS - ZONE 1	12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
	06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
	12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

PLUMBERS & GASFITTERS	03/01/2015	\$50.21	\$10.32	\$14.89	\$0.00	\$75.42
PLUMBERS & GASFITTERS LOCAL 12	09/01/2015	\$51.21	\$10.32	\$14.89	\$0.00	\$76.42
	03/01/2016	\$52.36	\$10.32	\$14.89	\$0.00	\$77.57
	09/01/2016	\$53.41	\$10.32	\$14.89	\$0.00	\$78.62
	03/01/2017	\$54.41	\$10.32	\$14.89	\$0.00	\$79.62

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate**Apprentice - PLUMBER/GASFITTER - Local 12****Effective Date - 03/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$17.57	\$10.32	\$5.54	\$0.00	\$33.43
2	40	\$20.08	\$10.32	\$6.27	\$0.00	\$36.67
3	55	\$27.62	\$10.32	\$8.42	\$0.00	\$46.36
4	65	\$32.64	\$10.32	\$9.87	\$0.00	\$52.83
5	75	\$37.66	\$10.32	\$11.30	\$0.00	\$59.28

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$17.92	\$10.32	\$5.54	\$0.00	\$33.78
2	40	\$20.48	\$10.32	\$6.27	\$0.00	\$37.07
3	55	\$28.17	\$10.32	\$8.42	\$0.00	\$46.91
4	65	\$33.29	\$10.32	\$9.87	\$0.00	\$53.48
5	75	\$38.41	\$10.32	\$11.30	\$0.00	\$60.03

Notes:

** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic\$56.05 Step5 with lic\$62.48

Apprentice to Journeyworker Ratio:****PNEUMATIC CONTROLS (TEMP.)**

PIPEFITTERS LOCAL 537

03/01/2015	\$48.69	\$9.70	\$16.89	\$0.00	\$75.28
09/01/2015	\$49.69	\$9.70	\$16.89	\$0.00	\$76.28
03/01/2016	\$50.69	\$9.70	\$16.89	\$0.00	\$77.28
09/01/2016	\$51.69	\$9.70	\$16.89	\$0.00	\$78.28
03/01/2017	\$52.69	\$9.70	\$16.89	\$0.00	\$79.28

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR

LABORERS - ZONE 1

06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER

LABORERS - ZONE 1

06/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
12/01/2015	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
06/01/2016	\$37.60	\$7.30	\$13.20	\$0.00	\$58.10
12/01/2016	\$38.60	\$7.30	\$13.20	\$0.00	\$59.10

For apprentice rates see "Apprentice- LABORER"

POWER SHOVEL/DERRICK/TRENCHING MACHINE

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
	12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
	06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
	12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
	06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
	12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2015	\$29.61	\$10.00	\$14.55	\$0.00	\$54.16
	12/01/2015	\$30.48	\$10.00	\$14.55	\$0.00	\$55.03
	06/01/2016	\$31.00	\$10.00	\$14.55	\$0.00	\$55.55
	12/01/2016	\$31.87	\$10.00	\$14.55	\$0.00	\$56.42
	06/01/2017	\$32.56	\$10.00	\$14.55	\$0.00	\$57.11
	12/01/2017	\$33.25	\$10.00	\$14.55	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/10 (Drivers Hired After 4/30/2010) <i>TEAMSTERS LOCAL 25b</i>	05/01/2015	\$27.88	\$7.73	\$8.92	\$0.00	\$44.53
	07/01/2015	\$27.88	\$7.98	\$8.92	\$0.00	\$44.78
	05/01/2016	\$28.03	\$7.98	\$9.31	\$0.00	\$45.32
	07/01/2016	\$28.03	\$8.23	\$9.31	\$0.00	\$45.57
	05/01/2017	\$28.18	\$8.23	\$9.72	\$0.00	\$46.13
	07/01/2017	\$28.18	\$8.48	\$9.72	\$0.00	\$46.38
READY-MIX CONCRETE DRIVER <i>TEAMSTERS LOCAL 25b</i>	05/01/2015	\$29.18	\$7.73	\$8.92	\$0.00	\$45.83
	07/01/2015	\$29.18	\$7.98	\$8.92	\$0.00	\$46.08
	05/01/2016	\$29.33	\$7.98	\$9.31	\$0.00	\$46.62
	07/01/2016	\$29.33	\$8.23	\$9.31	\$0.00	\$46.87
	05/01/2017	\$29.48	\$8.23	\$9.72	\$0.00	\$47.43
	07/01/2017	\$29.48	\$8.48	\$9.72	\$0.00	\$47.68
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
	12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
	06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
	12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
	06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
	12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) <i>CARPENTERS -ZONE 2 (Residential Wood)</i>	04/01/2011	\$24.24	\$8.67	\$15.51	\$0.00	\$48.42
RESIDENTIAL WOOD FRAME CARPENTER ** ** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement. <i>CARPENTERS -ZONE 2 (Residential Wood)</i> As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.	05/01/2011	\$24.24	\$6.34	\$6.23	\$0.00	\$36.81

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - CARPENTER (Residential Wood Frame) - Zone 2

Effective Date - 05/01/2011

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$14.54	\$6.34	\$0.00	\$0.00	\$20.88
2	60	\$14.54	\$6.34	\$6.23	\$0.00	\$27.11
3	65	\$15.76	\$6.34	\$6.23	\$0.00	\$28.33
4	70	\$16.97	\$6.34	\$6.23	\$0.00	\$29.54
5	75	\$18.18	\$6.34	\$6.23	\$0.00	\$30.75
6	80	\$19.39	\$6.34	\$6.23	\$0.00	\$31.96
7	85	\$20.60	\$6.34	\$6.23	\$0.00	\$33.17
8	90	\$21.82	\$6.34	\$6.23	\$0.00	\$34.39

Notes:

Apprentice to Journeyworker Ratio:1:5

RIDE-ON MOTORIZED BUGGY OPERATOR

LABORERS - ZONE 1

06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

ROLLER/SPREADER/MULCHING MACHINE

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

ROOFER (Inc.Roofers Waterproofing &Roofers Damproofg)

ROOFERS LOCAL 33

02/01/2015	\$40.11	\$10.50	\$11.60	\$0.00	\$62.21
08/01/2015	\$41.01	\$10.50	\$11.60	\$0.00	\$63.11
02/01/2016	\$41.91	\$10.50	\$11.60	\$0.00	\$64.01

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - ROOFER - Local 33

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.06	\$10.50	\$3.38	\$0.00	\$33.94
2	60	\$24.07	\$10.50	\$11.60	\$0.00	\$46.17
3	65	\$26.07	\$10.50	\$11.60	\$0.00	\$48.17
4	75	\$30.08	\$10.50	\$11.60	\$0.00	\$52.18
5	85	\$34.09	\$10.50	\$11.60	\$0.00	\$56.19

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.51	\$10.50	\$3.38	\$0.00	\$34.39
2	60	\$24.61	\$10.50	\$11.60	\$0.00	\$46.71
3	65	\$26.66	\$10.50	\$11.60	\$0.00	\$48.76
4	75	\$30.76	\$10.50	\$11.60	\$0.00	\$52.86
5	85	\$34.86	\$10.50	\$11.60	\$0.00	\$56.96

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE	02/01/2015	\$40.36	\$10.50	\$11.60	\$0.00	\$62.46
ROOFERS LOCAL 33	08/01/2015	\$41.26	\$10.50	\$11.60	\$0.00	\$63.36
	02/01/2016	\$42.16	\$10.50	\$11.60	\$0.00	\$64.26
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER	02/01/2015	\$43.28	\$10.20	\$20.54	\$2.22	\$76.24
SHEETMETAL WORKERS LOCAL 17 - A	08/01/2015	\$44.28	\$10.20	\$20.54	\$2.22	\$77.24
	02/01/2016	\$45.28	\$10.20	\$20.54	\$2.22	\$78.24
	08/01/2016	\$46.43	\$10.20	\$20.54	\$2.22	\$79.39
	02/01/2017	\$47.53	\$10.20	\$20.54	\$2.22	\$80.49
	08/01/2017	\$48.63	\$10.20	\$20.54	\$2.22	\$81.59
	02/01/2018	\$49.78	\$10.20	\$20.54	\$2.22	\$82.74

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SHEET METAL WORKER - Local 17-A
Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.31	\$10.20	\$4.58	\$0.00	\$32.09
2	40	\$17.31	\$10.20	\$4.58	\$0.00	\$32.09
3	45	\$19.48	\$10.20	\$9.09	\$1.16	\$39.93
4	45	\$19.48	\$10.20	\$9.09	\$1.16	\$39.93
5	50	\$21.64	\$10.20	\$9.91	\$1.25	\$43.00
6	50	\$21.64	\$10.20	\$10.16	\$1.26	\$43.26
7	60	\$25.97	\$10.20	\$11.55	\$1.43	\$49.15
8	65	\$28.13	\$10.20	\$12.38	\$1.52	\$52.23
9	75	\$32.46	\$10.20	\$14.02	\$1.70	\$58.38
10	85	\$36.79	\$10.20	\$15.16	\$1.86	\$64.01

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.71	\$10.20	\$4.58	\$0.00	\$32.49
2	40	\$17.71	\$10.20	\$4.58	\$0.00	\$32.49
3	45	\$19.93	\$10.20	\$9.09	\$1.18	\$40.40
4	45	\$19.93	\$10.20	\$9.09	\$1.18	\$40.40
5	50	\$22.14	\$10.20	\$9.91	\$1.27	\$43.52
6	50	\$22.14	\$10.20	\$10.16	\$1.28	\$43.78
7	60	\$26.57	\$10.20	\$11.55	\$1.45	\$49.77
8	65	\$28.78	\$10.20	\$12.38	\$1.54	\$52.90
9	75	\$33.21	\$10.20	\$14.02	\$1.72	\$59.15
10	85	\$37.64	\$10.20	\$15.16	\$1.89	\$64.89

Notes:

Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4
SIGN ERECTOR
PAINTERS LOCAL 35 - ZONE 2

06/01/2013 \$25.81 \$7.07 \$7.05 \$0.00 \$39.93

Apprentice - SIGN ERECTOR - Local 35 Zone 2

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$12.91	\$7.07	\$0.00	\$0.00	\$19.98
2	55	\$14.20	\$7.07	\$2.45	\$0.00	\$23.72
3	60	\$15.49	\$7.07	\$2.45	\$0.00	\$25.01
4	65	\$16.78	\$7.07	\$2.45	\$0.00	\$26.30
5	70	\$18.07	\$7.07	\$7.05	\$0.00	\$32.19
6	75	\$19.36	\$7.07	\$7.05	\$0.00	\$33.48
7	80	\$20.65	\$7.07	\$7.05	\$0.00	\$34.77
8	85	\$21.94	\$7.07	\$7.05	\$0.00	\$36.06
9	90	\$23.23	\$7.07	\$7.05	\$0.00	\$37.35

Notes:
Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2015	\$33.04	\$9.91	\$9.33	\$0.00	\$52.28
	08/01/2015	\$33.04	\$10.41	\$9.33	\$0.00	\$52.78
	12/01/2015	\$33.04	\$10.41	\$10.08	\$0.00	\$53.53
	06/01/2016	\$33.54	\$10.41	\$10.08	\$0.00	\$54.03
	08/01/2016	\$33.54	\$10.91	\$10.08	\$0.00	\$54.53
	12/01/2016	\$33.54	\$10.91	\$10.89	\$0.00	\$55.34
SPECIALIZED EARTH MOVING EQUIP > 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE A	06/01/2015	\$33.33	\$9.91	\$9.33	\$0.00	\$52.57
	08/01/2015	\$33.33	\$10.41	\$9.33	\$0.00	\$53.07
	12/01/2015	\$33.33	\$10.41	\$10.08	\$0.00	\$53.82
	06/01/2016	\$33.83	\$10.41	\$10.08	\$0.00	\$54.32
	08/01/2016	\$33.83	\$10.91	\$10.08	\$0.00	\$54.82
	12/01/2016	\$33.83	\$10.91	\$10.89	\$0.00	\$55.63
SPRINKLER FITTER SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1	03/01/2015	\$54.43	\$8.42	\$14.90	\$0.00	\$77.75
	10/01/2015	\$55.58	\$8.42	\$14.90	\$0.00	\$78.90
	01/01/2016	\$55.58	\$8.67	\$15.05	\$0.00	\$79.30
	03/01/2016	\$56.58	\$8.67	\$15.05	\$0.00	\$80.30
	10/01/2016	\$57.73	\$8.67	\$15.05	\$0.00	\$81.45
	03/01/2017	\$58.73	\$8.67	\$15.05	\$0.00	\$82.45

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - SPRINKLER FITTER - Local 550 (Section A) Zone 1

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$19.05	\$8.42	\$8.40	\$0.00	\$35.87
2	40	\$21.77	\$8.42	\$8.40	\$0.00	\$38.59
3	45	\$24.49	\$8.42	\$8.40	\$0.00	\$41.31
4	50	\$27.22	\$8.42	\$8.40	\$0.00	\$44.04
5	55	\$29.94	\$8.42	\$8.40	\$0.00	\$46.76
6	60	\$32.66	\$8.42	\$8.40	\$0.00	\$49.48
7	65	\$35.38	\$8.42	\$8.40	\$0.00	\$52.20
8	70	\$38.10	\$8.42	\$8.40	\$0.00	\$54.92
9	75	\$40.82	\$8.42	\$8.40	\$0.00	\$57.64
10	80	\$43.54	\$8.42	\$8.40	\$0.00	\$60.36

Effective Date - 10/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$19.45	\$8.42	\$8.40	\$0.00	\$36.27
2	40	\$22.23	\$8.42	\$8.40	\$0.00	\$39.05
3	45	\$25.01	\$8.42	\$8.40	\$0.00	\$41.83
4	50	\$27.79	\$8.42	\$8.40	\$0.00	\$44.61
5	55	\$30.57	\$8.42	\$8.40	\$0.00	\$47.39
6	60	\$33.35	\$8.42	\$8.40	\$0.00	\$50.17
7	65	\$36.13	\$8.42	\$8.40	\$0.00	\$52.95
8	70	\$38.91	\$8.42	\$8.40	\$0.00	\$55.73
9	75	\$41.69	\$8.42	\$8.40	\$0.00	\$58.51
10	80	\$44.46	\$8.42	\$8.40	\$0.00	\$61.28

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Issue Date: 06/30/2015

Wage Request Number: 20150630-035

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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELECOMMUNICATION TECHNICIAN	03/01/2015	\$33.88	\$13.00	\$13.70	\$0.00	\$60.58
ELECTRICIANS LOCAL 103	09/01/2015	\$34.60	\$13.00	\$13.72	\$0.00	\$61.32
	03/01/2016	\$35.31	\$13.00	\$13.74	\$0.00	\$62.05

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103

Effective Date - 03/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$13.55	\$13.00	\$0.41	\$0.00	\$26.96
2	40	\$13.55	\$13.00	\$0.41	\$0.00	\$26.96
3	45	\$15.25	\$13.00	\$10.87	\$0.00	\$39.12
4	45	\$15.25	\$13.00	\$10.87	\$0.00	\$39.12
5	50	\$16.94	\$13.00	\$11.11	\$0.00	\$41.05
6	55	\$18.63	\$13.00	\$11.38	\$0.00	\$43.01
7	60	\$20.33	\$13.00	\$11.64	\$0.00	\$44.97
8	65	\$22.02	\$13.00	\$11.89	\$0.00	\$46.91
9	70	\$23.72	\$13.00	\$12.15	\$0.00	\$48.87
10	75	\$25.41	\$13.00	\$12.41	\$0.00	\$50.82

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$13.84	\$13.00	\$0.42	\$0.00	\$27.26
2	40	\$13.84	\$13.00	\$0.42	\$0.00	\$27.26
3	45	\$15.57	\$13.00	\$10.88	\$0.00	\$39.45
4	45	\$15.57	\$13.00	\$10.88	\$0.00	\$39.45
5	50	\$17.30	\$13.00	\$11.14	\$0.00	\$41.44
6	55	\$19.03	\$13.00	\$11.39	\$0.00	\$43.42
7	60	\$20.76	\$13.00	\$11.65	\$0.00	\$45.41
8	65	\$22.49	\$13.00	\$11.90	\$0.00	\$47.39
9	70	\$24.22	\$13.00	\$12.17	\$0.00	\$49.39
10	75	\$25.95	\$13.00	\$12.43	\$0.00	\$51.38

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS	02/01/2015	\$47.90	\$10.18	\$18.50	\$0.00	\$76.58
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2015	\$48.80	\$10.18	\$18.57	\$0.00	\$77.55
	02/01/2016	\$49.37	\$10.18	\$18.57	\$0.00	\$78.12
	08/01/2016	\$50.27	\$10.18	\$18.65	\$0.00	\$79.10
	02/01/2017	\$50.84	\$10.18	\$18.65	\$0.00	\$79.67

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile

Effective Date - 02/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.95	\$10.18	\$18.50	\$0.00	\$52.63
2	60	\$28.74	\$10.18	\$18.50	\$0.00	\$57.42
3	70	\$33.53	\$10.18	\$18.50	\$0.00	\$62.21
4	80	\$38.32	\$10.18	\$18.50	\$0.00	\$67.00
5	90	\$43.11	\$10.18	\$18.50	\$0.00	\$71.79

Effective Date - 08/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.40	\$10.18	\$18.57	\$0.00	\$53.15
2	60	\$29.28	\$10.18	\$18.57	\$0.00	\$58.03
3	70	\$34.16	\$10.18	\$18.57	\$0.00	\$62.91
4	80	\$39.04	\$10.18	\$18.57	\$0.00	\$67.79
5	90	\$43.92	\$10.18	\$18.57	\$0.00	\$72.67

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER

LABORERS - FOUNDATION AND MARINE

06/01/2015	\$36.45	\$7.30	\$13.40	\$0.00	\$57.15
12/01/2015	\$37.20	\$7.30	\$13.40	\$0.00	\$57.90
06/01/2016	\$37.95	\$7.30	\$13.40	\$0.00	\$58.65
12/01/2016	\$38.95	\$7.30	\$13.40	\$0.00	\$59.65

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER

LABORERS - FOUNDATION AND MARINE

06/01/2015	\$35.17	\$7.30	\$13.40	\$0.00	\$55.87
12/01/2015	\$35.92	\$7.30	\$13.40	\$0.00	\$56.62
06/01/2016	\$36.67	\$7.30	\$13.40	\$0.00	\$57.37
12/01/2016	\$37.67	\$7.30	\$13.40	\$0.00	\$58.37

For apprentice rates see "Apprentice- LABORER"

TEST BORING LABORER

LABORERS - FOUNDATION AND MARINE

06/01/2015	\$35.05	\$7.30	\$13.40	\$0.00	\$55.75
12/01/2015	\$35.80	\$7.30	\$13.40	\$0.00	\$56.50
06/01/2016	\$36.55	\$7.30	\$13.40	\$0.00	\$57.25
12/01/2016	\$37.55	\$7.30	\$13.40	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

TRACTORS/PORTABLE STEAM GENERATORS

OPERATING ENGINEERS LOCAL 4

06/01/2015	\$42.42	\$10.00	\$14.55	\$0.00	\$66.97
12/01/2015	\$43.66	\$10.00	\$14.55	\$0.00	\$68.21
06/01/2016	\$44.41	\$10.00	\$14.55	\$0.00	\$68.96
12/01/2016	\$45.64	\$10.00	\$14.55	\$0.00	\$70.19
06/01/2017	\$46.63	\$10.00	\$14.55	\$0.00	\$71.18
12/01/2017	\$47.62	\$10.00	\$14.55	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	06/01/2015	\$33.62	\$9.91	\$9.33	\$0.00	\$52.86
	08/01/2015	\$33.62	\$10.41	\$9.33	\$0.00	\$53.36
	12/01/2015	\$33.62	\$10.41	\$10.08	\$0.00	\$54.11
	06/01/2016	\$34.12	\$10.41	\$10.08	\$0.00	\$54.61
	08/01/2016	\$34.12	\$10.91	\$10.08	\$0.00	\$55.11
	12/01/2016	\$34.12	\$10.91	\$10.89	\$0.00	\$55.92
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	06/01/2015	\$47.33	\$7.30	\$13.80	\$0.00	\$68.43
	12/01/2015	\$48.08	\$7.30	\$13.80	\$0.00	\$69.18
	06/01/2016	\$48.83	\$7.30	\$13.80	\$0.00	\$69.93
	12/01/2016	\$49.83	\$7.30	\$13.80	\$0.00	\$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	06/01/2015	\$49.33	\$7.30	\$13.80	\$0.00	\$70.43
	12/01/2015	\$50.08	\$7.30	\$13.80	\$0.00	\$71.18
	06/01/2016	\$50.83	\$7.30	\$13.80	\$0.00	\$71.93
	12/01/2016	\$51.83	\$7.30	\$13.80	\$0.00	\$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2015	\$39.40	\$7.30	\$13.80	\$0.00	\$60.50
	12/01/2015	\$40.15	\$7.30	\$13.80	\$0.00	\$61.25
	06/01/2016	\$40.90	\$7.30	\$13.80	\$0.00	\$62.00
	12/01/2016	\$41.90	\$7.30	\$13.80	\$0.00	\$63.00
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2015	\$41.40	\$7.30	\$13.80	\$0.00	\$62.50
	12/01/2015	\$42.15	\$7.30	\$13.80	\$0.00	\$63.25
	06/01/2016	\$42.90	\$7.30	\$13.80	\$0.00	\$64.00
	12/01/2016	\$43.90	\$7.30	\$13.80	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	06/01/2015	\$33.04	\$9.91	\$9.33	\$0.00	\$52.28
	08/01/2015	\$33.04	\$10.41	\$9.33	\$0.00	\$52.78
	12/01/2015	\$33.04	\$10.41	\$10.08	\$0.00	\$53.53
	06/01/2016	\$33.54	\$10.41	\$10.08	\$0.00	\$54.03
	08/01/2016	\$33.54	\$10.91	\$10.08	\$0.00	\$54.53
	12/01/2016	\$33.54	\$10.91	\$10.89	\$0.00	\$55.34
WAGON DRILL OPERATOR <i>LABORERS - ZONE 1</i>	06/01/2015	\$35.35	\$7.30	\$13.20	\$0.00	\$55.85
	12/01/2015	\$36.10	\$7.30	\$13.20	\$0.00	\$56.60
	06/01/2016	\$36.85	\$7.30	\$13.20	\$0.00	\$57.35
	12/01/2016	\$37.85	\$7.30	\$13.20	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2015	\$42.83	\$10.00	\$14.55	\$0.00	\$67.38
	12/01/2015	\$44.08	\$10.00	\$14.55	\$0.00	\$68.63
	06/01/2016	\$44.83	\$10.00	\$14.55	\$0.00	\$69.38
	12/01/2016	\$46.08	\$10.00	\$14.55	\$0.00	\$70.63
	06/01/2017	\$47.08	\$10.00	\$14.55	\$0.00	\$71.63
	12/01/2017	\$48.08	\$10.00	\$14.55	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WATER METER INSTALLER <i>PLUMBERS & GASFITTERS LOCAL 12</i>	03/01/2015	\$50.21	\$10.32	\$14.89	\$0.00	\$75.42
	09/01/2015	\$51.21	\$10.32	\$14.89	\$0.00	\$76.42
	03/01/2016	\$52.36	\$10.32	\$14.89	\$0.00	\$77.57
	09/01/2016	\$53.41	\$10.32	\$14.89	\$0.00	\$78.62
	03/01/2017	\$54.41	\$10.32	\$14.89	\$0.00	\$79.62
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$25.66	\$8.70	\$4.48	\$0.00	\$38.84
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$36.55	\$8.70	\$6.58	\$0.00	\$51.83
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$29.94	\$8.70	\$6.05	\$0.00	\$44.69
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$23.52	\$8.70	\$5.24	\$0.00	\$37.46
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$36.35	\$8.70	\$9.43	\$0.00	\$54.48
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$32.08	\$8.70	\$6.59	\$0.00	\$47.37
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$23.52	\$8.70	\$3.72	\$0.00	\$35.94
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$19.25	\$8.70	\$2.85	\$0.00	\$30.80
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/01/2013	\$42.77	\$8.70	\$11.78	\$0.00	\$63.25

Apprentice - LINEMAN (Outside Electrical) - East Local 104

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$25.66	\$8.70	\$4.24	\$0.00	\$38.60
2	65	\$27.80	\$8.70	\$4.71	\$0.00	\$41.21
3	70	\$29.94	\$8.70	\$5.43	\$0.00	\$44.07
4	75	\$32.08	\$8.70	\$6.16	\$0.00	\$46.94
5	80	\$34.22	\$8.70	\$6.88	\$0.00	\$49.80
6	85	\$36.35	\$8.70	\$7.62	\$0.00	\$52.67
7	90	\$38.49	\$8.70	\$8.83	\$0.00	\$56.02

Notes:

Apprentice to Journeyworker Ratio:1:2

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/01/2015	\$28.12	\$4.25	\$3.09	\$0.00	\$35.46
	01/01/2016	\$28.98	\$4.25	\$3.12	\$0.00	\$36.35
TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/01/2015	\$26.49	\$4.25	\$3.04	\$0.00	\$33.78
	01/01/2016	\$27.31	\$4.25	\$3.07	\$0.00	\$34.63
TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/01/2015	\$26.49	\$4.25	\$3.04	\$0.00	\$33.78
	01/01/2016	\$27.31	\$4.25	\$3.07	\$0.00	\$34.63
TREE TRIMMER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/01/2015	\$18.05	\$3.55	\$0.00	\$0.00	\$21.60
	01/31/2016	\$18.51	\$3.55	\$0.00	\$0.00	\$22.06
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.						
TREE TRIMMER GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/01/2015	\$15.92	\$3.55	\$0.00	\$0.00	\$19.47
	01/31/2016	\$16.32	\$3.55	\$0.00	\$0.00	\$19.87
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.						

Additional Apprentices Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

**** Multiple ratios are listed in the comment field.**

PP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
PP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM

Company's Name:		Address:				Phone No.:			Payroll No.:						
Employer's Signature:		Title:				Contract No.:		Tax Payer ID Number		Work Week					
Awarding Authority's Name:		Public Works Project Name:				Public Works Project Location:			Min. Wage F						
General / Prime Contractor's Name:		Subcontractor's Name:						"Employer" Hourly Fringe Benefit Cont							
Employee Name & Complete Address	Work Classification:	Employee is OSHA 10 certified (?)	Appr. Rate (%)	Hours Worked							Project Hours (A) All Other Hours	Hourly Base Wage (B)	Health & Welfare Insurance (C)	ERISA Pension Plan (D)	
				Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.					

Are all apprentice employees identified above currently registered with the MA DLS's Division of Apprentice Standards? YES ☐

For all apprentices performing work during the reporting period, attach a copy of the apprentice identification card issued by the Massachusetts Department of Labor Standards / Division of Apprentice Standards. No app ☐

NOTE: Pursuant to MGL c. 149, s. 27B, every contractor and subcontractor is required to submit a true and accurate copy of their certified weekly authority by first-class mail or e-mail. In addition, each weekly payroll must be accompanied by a statement of compliance signed by the employer commencement of a criminal action or the issuance of a civil citation.

WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form is available from the Department of Labor Standards (DLS) at www.mass.gov/dols/pw and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

On a weekly basis, every contractor and subcontractor is required to submit a certified copy of their weekly payroll records to the awarding authority; this includes the payroll forms and the Statement of Compliance form. The certified payroll records must be submitted either by regular mail or by e-mail to the awarding authority. Once collected, the awarding authority is required to preserve those records for three years from the date of completion of the project.

Each such contractor and subcontractor shall furnish weekly **and** within 15 days after completion of its portion of the work, to the awarding authority directly by first-class mail or e-mail, a statement, executed by the contractor, subcontractor or by any authorized officer thereof who supervised the payment of wages, this form, accompanied by their payroll:

STATEMENT OF COMPLIANCE

_____, 20____

I, _____, _____
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by
_____ on the _____

(Contractor, subcontractor or public body)

(Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

3.

**U.S.A. DOT
Federal Transit
Administration
Contract Requirements**

U.S.A. DOT Federal Transit Administration Contract Requirements

A.	General
B.	Disadvantaged Business Enterprise
C.	Title VI of the Civil Rights Act of 1964
D.	Energy Conservation
E.	Cargo Preference
F.	Audit and Inspection
G.	Environmental, Resource Conservation, Energy Requirements, Seismic Safety, Clean Water and Recycled Products
H.	Notice of Federal Regulations
I.	Record Retention
J.	ADA
K.	Buy America Certification
L.	Fly America
M.	No Obligation by the Federal Government
N.	Program Fraud and False or Fraudulent Statements and Related Acts
O.	Termination
P.	Remedies/Breach of Contract
Q.	Integrity Certification
R.	Lobbying
S.	Nondiscrimination
T.	Liquidated Damages
U.	Labor Provisions
V.	Interests of Members of Congress
W.	Debarred Bidders
X.	Insurance / Bonding
Y.	Project Signs
Z.	Certified Payroll - Construction Projects
AA.	Disadvantaged Business Enterprise
BB.	DBE Obligation
CC.	Minimum Federal Wage Rates
DD.	Equal Employment Opportunity (EEO)

Standard Federal Equal Employment Opportunity
Construction Contract Specification

Appx. No. 1 - Notice of Requirement for Affirmative Action to Ensure Equal
Employment Opportunity

A. GENERAL

1. These Contract provisions shall apply to all Work performed on the Contract by the Contractor's own organization and with the assistance of workers under the Contractor's immediate superintendence and to all Work performed on the Contract by piecework, station work, or by Subcontract.
2. Except as otherwise provided for in each Section, the Contractor shall insert in each Subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier Subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime Contractor shall be responsible for compliance by any Subcontractor or lower tier Subcontractor with these Required Contract Provisions.
3. A breach of the following clauses of the Required Contract Provisions shall be sufficient grounds for termination of the Contract.

B. DISADVANTAGED BUSINESS ENTERPRISE

THE (CONTRACTOR OR SUBCONTRACTOR AND ITS THIRD PARTY CONTRACTORS) SHALL NOT DISCRIMINATE ON THE BASIS OF RACE, COLOR, NATIONAL ORIGIN, AGE, OR SEX IN THE PERFORMANCE OF THIS (CONTRACT OR AGREEMENT). THE REQUIREMENTS OF 49 C.F.R. PART 23 AND THE AUTHORITY'S U.S. DOT-APPROVED DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM (WHERE REQUIRED) ARE INCORPORATED IN THIS (CONTRACT AGREEMENT) BY REFERENCE. FAILURE BY THE (CONTRACTOR OR SUBCONTRACTOR AND ITS THIRD PARTY CONTRACTORS) TO CARRY OUT THESE REQUIREMENTS IS A MATERIAL BREACH OF THE (CONTRACT OR AGREEMENT), WHICH MAY RESULT IN THE TERMINATION OF THIS (CONTRACT OR AGREEMENT) OR SUCH OTHER REMEDY AS THE AUTHORITY DEEMS APPROPRIATE.

This section is in addition to and not a replacement of any other portion of the language of this Contract dealing with Disadvantaged Business Enterprises, Equal Opportunity, or Affirmative Action.

1. The Contractor shall provide information and reports requested by the Authority pertaining to its obligations under this Section, or other similar requirements of this Contract, and will permit access to Contract- related records, accounts and other relevant sources of information as necessary to determine the Engineer's compliance with the obligation hereunder.
2. The Contractor shall comply with all regulations relative to nondiscrimination in federally assisted programs of the U.S. Department of Transportation and the Authority as they may be amended from time to time and which are hereby incorporated by reference and made a part of this Contract.

***** (THIRD PARTY CONTRACTING REFERS TO CONTRACTING BY AUTHORITY USING FEDERAL ASSISTANCE).**

C. TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

The Contractor agrees to comply with, and assure the compliance by its subcontractors and third party contractors under this Project, with all requirements of Title VI of the Civil Rights Act of 1964, 42 U.S.C. §

2000d; U.S. DOT regulations, "Nondiscrimination in Federally Assisted Programs of the Department of Transportation -- Effectuation of Title VI of the Civil Rights Act," 49 C.F.R. Part 21.

D. ENERGY CONSERVATION

The Contractor, Subcontractors and its third party contractors shall comply with mandatory standards and policies relating to energy efficiency that are contained in applicable State energy conservation plans issued in compliance with Energy Policy and Conservation Act, U.S.C. §§ 6321 et seq.

E. CARGO PREFERENCE - USE OF UNITED STATES FLAG VESSELS

As required by 46 C.F.R. PART 381, the Contractor agrees --

1. TO UTILIZE PRIVATELY OWNED UNITED STATES-FLAG COMMERCIAL VESSELS TO SHIP AT LEAST 50 PERCENT OF THE GROSS TONNAGE (COMPUTED SEPARATELY FOR DRY BULK CARRIERS, DRY CARGO LINERS, AND TANKERS) INVOLVED, WHENEVER SHIPPING ANY EQUIPMENT, MATERIALS, OR COMMODITIES PURSUANT TO THIS CONTRACT TO THE EXTENT SUCH VESSELS ARE AVAILABLE AT FAIR AND REASONABLE RATES FOR UNITED STATES-FLAG COMMERCIAL VESSELS.
2. TO FURNISH WITHIN 20 DAYS FOLLOWING THE DATE OF LOADING FOR SHIPMENTS ORIGINATING WITHIN THE UNITED STATES, OR WITHIN 30 WORKING DAYS FOLLOWING THE DATE OF LOADING FOR SHIPMENTS ORIGINATING OUTSIDE THE UNITED STATES, A LEGIBLE COPY OF A RATED, "ON-BOARD" COMMERCIAL OCEAN BILL-OF-LADING IN ENGLISH FOR EACH SHIPMENT OF CARGO DESCRIBED IN PARAGRAPH (1) ABOVE TO THE CONTRACTOR (THROUGH THE PRIME CONTRACTOR IN THE CASE OF SUBCONTRACTOR BILLS-OF-LADING) AND TO THE DIVISION OF NATIONAL CARGO, OFFICE OF MARKET DEVELOPMENT, MARITIME ADMINISTRATION, 400 SEVENTH STREET, S.W., WASHINGTON, D.C. 20590, MARKED WITH APPROPRIATE IDENTIFICATION OF THE PROJECT.
3. TO INSERT THE SUBSTANCE OF THE PROVISIONS OF THIS CLAUSE IN ALL SUBCONTRACTS ISSUED PURSUANT TO THIS CONTRACT.

F. AUDIT AND INSPECTION

Inspection by Federal Officials. The Contractor agrees to permit the Secretary of Transportation (Secretary) and the Comptroller General of the United States, or their authorized representatives, to inspect all Project work, materials, payrolls, and other data, and to audit the books, records, and accounts of the Contractor and its subcontractors pertaining to the Project. The Contractor agrees to require each third party contractor whose contract award is not based on competitive bidding procedures as defined by the Secretary to permit the Secretary of Transportation and the Comptroller General of the United States, or their duly authorized representatives, to inspect all work, materials, payrolls, and other data and records involving that contract, and to audit the books, records, and accounts involving that contract as it affects the Project.

G. ENVIRONMENTAL, RESOURCE CONSERVATION, and ENERGY REQUIREMENTS

The Authority recognizes that many Federal and State statutes imposing environmental, resource conservation, and energy requirements may apply to the Project. Some, but not all, of the major Federal laws that may affect the Project include: the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321

et seq. the Clean Air Act, as amended, 42 U.S.C. 7401 et seq. and scattered sections of 29 U.S.C.; the Clean Water Act, as amended, scattered sections of 33 U.S.C. and 12 U.S.C.; the Resource Conservation and Recovery Act, as amended, 42 U.S.C. §§ 6901 et seq.; and the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§ 9601 et seq. The Authority also recognizes that the Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA) and other agencies of the Federal Government have issued and are expected in the future to issue requirements in the form of regulations, guidelines, standards, orders, or other directives that may affect the Project. Accordingly, the Authority agrees to adhere to, and impose on its contractors and subcontractors, any such Federal requirements, as the Federal Government may now or in the future promulgate. Listed below are requirements of particular concern to FTA. The Authority expressly understands that this list does not constitute the Authority's entire obligation to meet Federal requirements.

1. **Environmental Protection**

The Contractor, Subcontractor and its third party contractors agree to comply with applicable requirements of the National Environmental Policy Act of 1969, as amended, 42 U.S.C. §§ 4321 et seq.; section 14 of the Federal Transit Act, as amended, 49 U.S.C. app. §§ 1610, Council on Environmental Quality regulations, 40 C.F.R. Part 1500 et seq.; and joint FHWA/FTA regulations, "Environmental Impact and Related Procedures," at 23 C.F.R. Part 771 and 49 C.F.R. Part 622.

2. **Air Quality**

The Contractor, Subcontractors and its third party contractors agree to comply with applicable requirements of EPA regulations, "Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 21 U.S.C. of the Federal Transit Act," 40 C.F.R. Part 51, Subpart T; and "Determining Conformity of Federal Actions to State or Federal Implementation Plans," 40 C.F.R. Part 93. To support the requisite air quality conformity finding for the Project, the Contractor, Subcontractors and its third party contractors agree to implement each air quality mitigation and control measure incorporated in the Project. The Authority agrees that any Project identified in an applicable State Implementation Plan (SIP) as a Transportation Control Measure, will be wholly consistent with the description of the design concept and scope of the Project set forth in the SIP.

EPA also imposes requirements pertaining to the Clean Air Act, as amended, that may apply to transit operators, particularly operators of large transit bus fleets. Thus, the Authority should be aware that the following EPA regulations, among others, may apply to its Project: "Control of Air Pollution from Motor Vehicles and Motor Vehicle Engines," 40 C.F.R. Part 85; "Control of Air Pollution from New and In-Use Motor Vehicles and New and In-Use-Motor Vehicle Engines: Certification and Test Procedures," 40 C.F.R. Part 86; and "Fuel Economy of Motor Vehicles," 40 C.F.R. Part 600.

3. **Use of Public Lands**

No publicly owned land from a park, recreation area, or wildlife or waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance may be used for the Project unless specific findings required by 49 U.S.C. § 303 are made by U.S. DOT.

4. **Historic Preservation**

The Authority agrees to assist the Federal Government and comply with section 106 of the National Historic Preservation Act, 16 U.S.C. § 470f, involving historic and archaeological preservation by:

- a. Consulting the State Historic Preservation Officer on the conduct of investigations, in accordance with Advisory Council on Historic Preservation regulations, "Protection of Historic and Cultural Properties," 36 C.F.R. Part 800, to identify properties and resources listed in or eligible for inclusion in the National Register of Historic Places that may be affected by the Project, and notifying the Federal Government (FTA) of the existence of any such properties; and
- b. Complying with all Federal requirements to avoid or mitigate adverse effects upon such properties.

5. **Energy Conservation**

The Contractor, Subcontractors and its third party contractors shall comply with mandatory standards and policies relating to energy efficiency that are contained in applicable State energy conservation plans issued in compliance with the Energy Policy and Conservation Act, 42 U.S.C. §§ 6321 *et seq.*

6. **Mitigation of Adverse Environmental Effects**

Should the proposed Project cause adverse environmental effects, the Authority agrees to take all reasonable steps to minimize such effects pursuant to 49 U.S.C. app. § 1610, all other applicable statutes, and the procedures set forth in 23 C.F.R. Part 771 and 49 C.F.R. Part 622. The Authority agrees to undertake all environmental mitigation measures that may be identified as commitments in applicable Environmental documents (such as environmental assessments, environmental impact statements, memoranda of agreement, and statements required by 49 U.S.C. § 303) and with any conditions imposed by the Federal Government as part of a finding of no significant impact or a record of decision; all such mitigation measures are incorporated in and made part of this Contract, the December 1993 FTA Grant Agreement with the MBTA (Agreement), by reference. As soon as the Federal Government and the Authority reach agreement on any mitigation measures that have been deferred, those measures will then be incorporated into this Agreement. Such mitigation measures may not be modified or withdrawn without the express written approval of the Federal Government.

7. The Contractor, Subcontractors and its third party contractors with all applicable standards, orders, or requirements issued under section 306 of Clean Air Act (42 U.S.C. 1857(h), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15) (Contracts, Subcontracts, and subgrants of amounts in excess of \$100,000).

8. **Seismic Safety**

The contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation Seismic Safety Regulations 49 CFR Part 41 and will certify to compliance to the extent required by the regulation. The contractor also agrees to ensure that all work performed under this contract including work performed by a subcontractor is in compliance with the

standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

9. Clean Water

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq.* The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

10. Recovered Materials

The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

H. NOTICE OF FEDERAL REQUIREMENTS

The Contractor is advised that Federal requirements applicable to this contract as set forth in federal law, regulations, policies, and related administrative practices may change during the performance of this contract. Any such changes shall also apply to this contract.

The following provisions included, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the following contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1E, dated June 19, 2003, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any Authority requests, which would cause the Authority to be in violation of the FTA terms and conditions.

The Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives. These include without limitation those listed directly or by reference in the Master Agreement (Form FTA MA (8) dated October 1, 2001 between the Authority and the FTA, as they may be amended or promulgated from time to time during this term of this contract. The Contractor's failure to comply shall constitute a material breach of contract.

I. RECORD RETENTION

Retention of all required records for 6 years after the MBTA makes final payment and all other pending matters are closed. [Refer to Authority's General Conditions Article 5.27].

J. ADA - Access Requirements for Individuals with Disabilities

The Contractor agrees to comply with, and assure that any subcontractor and third party contractors, under this Project comply with all applicable requirements of the Americans with Disabilities Act Of 1990 (ADA), 42 U.S.C. §§ 12101 *et seq.*; section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794; section 16 of the Federal Transit Act, as amended, 49 U.S.C. app. §1612; and the following regulations and any amendments thereto:

1. U.S. DOT regulations, "Transportation Services for Individuals with Disabilities (ADA), 49 C.F.R. Part 37;
2. U.S. DOT regulations, "Nondiscrimination on the Basis of Handicap in Programs and Activities Receiving or Benefiting from Federal Financial Assistance," 49 C.F.R. Part 27;
3. U.S. DOT regulations, "Americans With Disabilities (ADA) Accessibility Specifications for Transportation Vehicles," 49 C.F.R. Part 38;
4. Department of Justice (DOJ) regulations, "Nondiscrimination on the Basis of Disability in State and Local Government Services," 28 C.F.R., Part 35;
5. DOJ regulations, "Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities," 28 C.F.R. Part 36.
6. General Services Administration regulations, "Accommodations for the Physically Handicapped," 41 C.F.R. Subpart 101-19;
7. Equal Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630;
8. Federal Communications Commission regulations, "Telecommunications Relay Services and Related Customer Premises Equipment for the Hearing and Speech Disabled," 47 C.F.R. Part 64, Subpart F; and
9. FTA regulations, "Transportation for Elderly and Handicapped Persons," 49 C.F.R. Part 609.

K. BUY AMERICA CERTIFICATION

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 CFR Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7, and include microcomputer equipment, software, and small purchases (currently less than \$100,000) made with capital, operating, or planning funds.

A bidder or offeror must submit to the FTA Authority the appropriate Buy America certification (below) with all bids on FTA-funded contracts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive. This requirement does not apply to lower tier subcontractors. *[For Certification Forms, refer to Bid Form].*

L. FLY AMERICA

The Contractor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and subrecipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S. Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the

Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

M. NO OBLIGATION BY THE FEDERAL GOVERNMENT

- (1) The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.
- (2) The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

N. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTS

- (1) The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 *et seq.* and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.
- (2) The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.
- (3) The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

O. TERMINATION

Termination for cause and convenience by the grantee for subgrantee including the manner by which it will be affected and the basis for settlement, (all contracts in excess of \$10,000). *[Refer to Authority's General Conditions and Supplementary Conditions].*

P. REMEDIES / BREACH OF CONTRACT

Administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate. *[Refer to Authority's General Conditions and Supplementary Conditions].*

Q. INTEGRITY CERTIFICATION

1. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion. [Refer to Bid Form]

a. Instructions for Certification - Primary Covered Transactions: (Applicable to all Federal contracts - 49 C.F.R. Part 29).

1. By signing and submitting this Proposal, the prospective participant is providing the certification set out below.
2. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of this prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntary excluded," as used in this clause, have the meanings set out in this Definitions and Coverage Sections of rules implementing Executive Order 12549. You may contact the department or agency to which this Proposal is submitted for assistance in obtaining a copy of those regulations.
6. The prospective primary participant agrees by submitting this Proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this agreement.
7. The Prospective primary participant further agrees by submitting this Proposal that it will include this clause titled "Certification regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lowered tier covered transactions.
8. A participation in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the

nonprocurement of the "List of Parties Excluded From Federal Procurement of Nonprocurement" (Nonprocurement List) which is compiled by the General Services Administration.

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
 10. Except for transactions authorized under paragraph(f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.
2. Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion - Primary Covered Transactions *[Refer to Bid Form]*
- a. **The prospective primary participant certifies to the best of its knowledge and belief, that it and its principle:**
 1. Are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any federal department or agency;
 2. Have not within a 3 year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction of contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1b) of this certification.
 4. Have not within a 3 year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default
 - b. **Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.**
 - c. **Instructions for Certification - Lower Tier Covered Transactions: (Applicable to all subcontracts, purchase orders and other tier transactions of \$25,000 or more -49 C.F.R. 29).**
 1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
 2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, have meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include in this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participation in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph (e) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- d. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- e. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

R. LOBBYING CERTIFICATION

Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.] - Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by 49 CFR part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient. *[Refer to Bid Form]*.

S. NONDISCRIMINATION - Pursuant to Department of Labor regulations at 41 C.F.R. §§ 60-1.4(b)(1) and 60-1.4(c):

1. DURING THE PERFORMANCE OF THIS CONTRACT, THE CONTRACTOR AGREES AS FOLLOWS:
 - a. THE CONTRACTOR WILL NOT DISCRIMINATE AGAINST ANY EMPLOYEE OR APPLICANT FOR EMPLOYMENT BECAUSE OF RACE, COLOR, RELIGION, SEX, AGE, DISABILITY, OR NATIONAL ORIGIN. THE CONTRACTOR WILL TAKE AFFIRMATIVE ACTION TO ENSURE THAT APPLICANTS ARE EMPLOYED, AND THAT EMPLOYEES ARE TREATED DURING EMPLOYMENT WITHOUT REGARD TO THEIR RACE, COLOR, RELIGION, SEX, AGE, DISABILITY OR NATIONAL ORIGIN. SUCH ACTION SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: EMPLOYMENT, UPGRADING, DEMOTION, OR TRANSFER; RECRUITMENT OR RECRUITMENT ADVERTISING; LAYOFF OR TERMINATION; RATES OF PAY OR OTHER FORMS OF COMPENSATION; AND SELECTION FOR TRAINING, INCLUDING APPRENTICESHIP. THE CONTRACTOR AGREES CONSPICUOUS PLACES, AVAILABLE TO EMPLOYEES AND APPLICANTS FOR EMPLOYMENT, NOTICES TO BE PROVIDED, SETTING FORTH THE PROVISIONS OF THIS NONDISCRIMINATION CLAUSE.
 - b. THE CONTRACTOR WILL, IN ALL SOLICITATIONS OR ADVERTISEMENTS FOR EMPLOYEES PLACED BY OR ON BEHALF OF THE CONTRACTOR, STATE THAT ALL QUALIFIED APPLICANTS WILL RECEIVE CONSIDERATION FOR EMPLOYMENT WITHOUT REGARD TO RACE, COLOR, RELIGION, SEX, AGE, DISABILITY, OR NATIONAL ORIGIN.
 - c. THE CONTRACTOR WILL SEND TO EACH LABOR UNION OR REPRESENTATIVE OF WORKERS WITH WHICH IT HAS A COLLECTIVE BARGAINING AGREEMENT OR OTHER CONTRACT OR UNDERSTANDING, A NOTICE TO BE PROVIDED ADVISING THE LABOR UNION OR WORKERS REPRESENTATIVE OF THE CONTRACTOR'S COMMITMENTS UNDER SECTION 202 OF EXECUTIVE ORDER NO. 11246 OF SEPTEMBER 24, 1965, AND SHALL POST COPIES OF THE NOTICE IN CONSPICUOUS PLACES AVAILABLE TO EMPLOYEES AND APPLICANTS FOR EMPLOYMENT.
 - d. THE CONTRACTOR WILL COMPLY WITH ALL PROVISIONS OF EXECUTIVE ORDER NO. 11246 OF SEPTEMBER 24, 1965, AND OF THE RULES, REGULATIONS, AND RELEVANT ORDERS OF THE SECRETARY OF LABOR.
 - e. THE CONTRACTOR WILL FURNISH ALL INFORMATION AND REPORTS REQUIRED BY EXECUTIVE ORDER NO. 11246 OF SEPTEMBER 24, 1965, AND BY THE RULES,

REGULATIONS, AND ORDERS OF THE SECRETARY OF LABOR, OR PURSUANT THERETO, AND WILL PERMIT ACCESS TO ITS BOOKS, RECORDS AND ACCOUNTS BY THE SECRETARY OF LABOR AND THE FEDERAL TRANSIT ADMINISTRATION (FTA) FOR PURPOSES OF INVESTIGATION TO ASCERTAIN COMPLIANCE WITH SUCH RULES, REGULATIONS, AND ORDERS.

- f. IN THE EVENT OF THE CONTRACTOR'S NONCOMPLIANCE WITH THE NONDISCRIMINATION CLAUSES OF THIS AGREEMENT OR WITH ANY OF SUCH RULES, REGULATIONS, OR ORDERS, THIS AGREEMENT MAY BE CANCELED, TERMINATED, OR SUSPENDED IN WHOLE OR IN PART AND THE CONTRACTOR MAY BE DECLARED INELIGIBLE FOR FURTHER FEDERAL OR FEDERALLY ASSISTED CONTRACTS IN ACCORDANCE WITH PROCEDURES AUTHORIZED IN EXECUTIVE ORDER NO. 11246 OF SEPTEMBER 24, 1965, AND SUCH OTHER SANCTIONS MAY BE IMPOSED AND REMEDIES INVOKED AS PROVIDED IN EXECUTIVE ORDER NO. 11246 OF SEPTEMBER 24, 1965, OR BY RULE, REGULATION, OR ORDER OF THE SECRETARY OF LABOR, OR AS OTHERWISE PROVIDED BY LAW.
- g. THE CONTRACTOR WILL INCLUDE THE PROVISIONS OF PARAGRAPHS(a) THROUGH (g) OF THIS SUBSECTION IN EVERY SUBCONTRACT OR PURCHASE ORDER UNLESS EXEMPTED BY RULES, REGULATIONS, OR ORDERS OF THE SECRETARY OF LABOR ISSUED PURSUANT TO SECTION 204 OF EXECUTIVE ORDER NO. 11246 OF SEPTEMBER 24, 1965, SO THAT SUCH PROVISIONS SHALL BE BINDING UPON EACH SUBCONTRACTOR OR VENDOR. THE CONTRACTOR WILL TAKE SUCH ACTION WITH RESPECT TO ANY SUBCONTRACT OR PURCHASE ORDER AS THE SECRETARY OF LABOR OR FTA MAY DIRECT AS A MEANS OF ENFORCING SUCH PROVISIONS, INCLUDING SANCTIONS FOR NONCOMPLIANCE; PROVIDED, HOWEVER, THAT IF A CONTRACTOR BECOMES INVOLVED IN, OR IS THREATENED WITH, LITIGATION WITH A SUBCONTRACTOR OR VENDOR AS A RESULT OF SUCH DIRECTION, THE CONTRACTOR MAY REQUEST THE UNITED STATES TO ENTER INTO SUCH LITIGATION TO PROTECT THE INTERESTS OF THE UNITED STATES.

T. LIQUIDATED DAMAGES

[Refer to Authority's General Conditions].

U. LABOR PROVISIONS.

1. Labor Provisions - Construction

a. Minimum Wages

- (1) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at the time of payment computed at rates not less than those contained in the Wage Determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1 (b) (2) of the Davis-Bacon Act on behalf of laborers or mechanics are

considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a) (1) (iv) of 29 CFR Sec. 5.5; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Sec. 5.5 (a) (4).

Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a) (1) (ii) of 29 CFR Sec. 5.5 and the Davis-Bacon Poster (WH-132) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- (2) The Contracting Office shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the Contract shall be classified in conformance with the wage determination. The Contracting Office shall approve an additional classification and wage rate and fringe benefits therefor, only when the following criteria have been met:
 - (a) The work to be performed by the classification requested is not performed by a classification in the wage determination: and
 - (b) The classification is utilized in the area by the construction industry: and
 - (c) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administration of the Wage and hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within a 30 day period that additional time is necessary.
- (4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator for determination. The administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.
- (5) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraph (a) (1) (B) or (C) of 29 CFR Sec. 5.5 shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

- (6) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (7) If the Contractor does not make payments to a trustee or other third person the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found upon the written request of the Contractor that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- (8) (A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:
- (a) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (b) The classification is utilized in the area by the construction industry; and
 - (c) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination with 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- (D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(v) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

2. **Withholding**

DOT shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other Federal Contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments of advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the Contract, the Department of Transportation may, after written notice to the Contractor, sponsor, applicant, or owner, take such any further payment, advance, or guarantee of funds until such violations have ceased.

3. **Payrolls and Basic Records**

- a. Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949 in the construction or development of the project). Such records shall contain the name, address, and social security number of each worker, his or her correct classification, hourly rates of wages paid including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof the types described in Section 1 (b) (2) (B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid.

Whenever the Secretary of Labor has found under 29 CFR Sec. 5.5 (a) (1) (iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b) (2) (b) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program has been communicated in writing to the labors or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices and trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- b. The Contractor shall submit weekly for each week in which any Contract work is performed a copy of all payrolls to the Department of Transportation if the Department of Transportation is a party to the Contract, but if the Department of Transportation is not such a party, the Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Department of Transportation. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under Sec. 5.5 (a) (3) (I) of regulations, 29 CFR Part 5. This information may be submitted in any form desired. Optional form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

- c. Each payroll submitted shall be accompanied by a "Statement of Compliance", signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:
 - (1) That the payroll for the payroll period contains the information required to be maintained under Sec. 5.5 (a) (3) (I) of regulations, 29 CFR Part 5 and that such information is correct and complete.
 - (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in regulations, 29 CFR Part 3.
 - (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.
- d. The weekly submission of a properly executed certification set forth on the reverse side of Optional form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a) (3) (ii) (b) of 29 CFR Sec. 5.5.
- e. The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.
- f. The Contractor or subcontractor shall make the records required under paragraph (a) (3) (I) of 29 CFR Sec. 5.5 available for inspection, copying, or transcription by authorized representatives of the Department of Transportation or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal Agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Sec. 5.12.

4. Apprentices and Trainees - Apprentices

- a. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training, or with a State Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on the payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above shall not be paid less than the applicable wage

determination for the work actually performed. In addition, any apprentice performing work on the job site in excess of the ration permitted under the registered program shall not be paid less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits, in accordance with the provisions of the apprentice program. If the apprentice program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an Apprenticeship Program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- b. **Trainees** Except as provided in 29 CFR Sec. 5.16, Trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidence by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provision of the trainee program. If the trainees program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman's wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the employment and training administration shall not be paid less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- c. **Equal Employment Opportunity** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the Equal Employment Opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. **Compliance with Copeland Act Requirements**

The Contractor shall comply with the requirements of the 29 CFR Part 3, which are incorporated by reference.

6. **Subcontracts**

The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. **Contract Termination: Debarment**

A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. **Compliance with Davis-Bacon and Related Act Requirements**

All rulings and interpretations of the Davis-Bacon and related acts contained in 29 CFR Parts 1,3 and 5 are herein incorporated by reference in this contract.

9. **Disputes Concerning Labor Standards**

Disputes arising out of the Labor Standards Provisions of this Contract shall not be subject to the general disputes clause of the Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the Contracting Agency, the U.S. Department of Labor, or the employees or their representatives.

10. **Certification of Eligibility**

By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded government contracts by virtue of section 3 (a) of the Davis-Bacon Act or 29 CFR Sec. 5.12 (a) (1).

- a. No part of this Contract shall be subcontracted to any person or firm ineligible for award of a government contract by virtue of section 3 (a) of the Davis-Bacon Act or 29 CFR Sec. 5.12(a) (1).
- b. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S. C. Sec. 1001.

11. **Overtime Requirements**

No Contractor or subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any work week in which he or she is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such work week unless such laborer or mechanic receives compensation at a rate of pay for all hours worked in excess of eight hours, in any calendar day or in excess of forty hours in such work week, whichever is greater.

12. Violation: Liability for Unpaid Wages: Liquidated Damages

In the event of any violation of the clause set forth in subparagraph (b) (1) 29 CFR Sec. 5.5, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such district or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (b) (1) of 29 CFR Sec. 5.5 in the sum of \$10 for each calendar day or which such individual was required or permitted to work in excess of eight hours or in excess of the standard work week of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (b) (1) or 29 CFR Sec. 5.

13. Withholding for Unpaid Wages and Liquidated Damages

The Department of Transportation or the recipient shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the Contractor or subcontractor under any such contract or any other federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (b) (2) of 29 CFR Sec. 5.5.

14. Nonconstruction Contracts

In addition to the clauses contained in 29 CFR Sec. 5.5 (b) (10) through (14), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR Sec. 5.1., the recipient shall insert a clause requiring that the Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the Contract for all laborers and mechanics, including guards and watchmen, working on the Contract. Such records shall contain the names and address of each employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the recipient shall require the Contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Department of Transportation and the Department of Labor, and the Contractor or subcontractor will permit such representatives to interview employees during work hours on the job.

15. Subcontracts

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph 1 through 12 of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraph 1 through 14 of this paragraph.

16. Certified Payroll - Construction Projects (11/7/77)

The Authority shall obtain from each Contractor and subcontractor a certified copy of each weekly payroll within seven days after the regular payroll date. Following a review by the Authority for compliance with State and Federal Labor Laws, the payroll copy shall be retained at the project site

for later review by the Federal Transportation Administration. The Contractor must use the Department of Labor Form WH-347 (pages 1 and 2), which provides all the necessary payroll information and certifications or they will be in violation of compliance. A copy of this form is attached as pages 68 and 69 of this Section.

17. **Disadvantaged Business Enterprise Policy.** It is the policy of the Department of Transportation that minority business enterprises, as defined in 49 CFR Part 26, shall have the opportunity to participate in the performance of contracts financed in whole or in part with federal funds under this agreement. Consequently, the MBE requirements of 49 CFR Part 26 apply to this agreement.
18. **DBE Obligation.** The Authority and its contractors agree to ensure that minority business enterprises as defined in 49 CFR Part 26 have the opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds provided under this Agreement. In this regard the Authority and its contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that disadvantaged business enterprises have the maximum opportunity to compete for and perform contracts. The Authority and its contractors shall not discriminate on the basis of race, color, national origin or sex in the award and performance of DOT assisted contracts.

V. INTERESTS OF MEMBERS OF CONGRESS

Interest of Members of Congress. No Member of or delegate to the Congress of the United States shall be admitted to any share or part of this Project or to any benefit therefrom.

W. DEBARRED BIDDERS - DEBARMENT AND SUSPENSION

The Authority agrees to obtain certifications on debarment and suspension from its third party contractors and subcontractors and otherwise comply with U.S. DOT regulations, "Governmentwide Debarment and Suspension (Nonprocurement) and Governmentwide Requirements for Drug-Free Work place (Grants)," 49 C.F.R. Part 29.

1. Executive Order 12549 provides that, to the extent permitted by law, Executive departments and agencies shall participate in a Governmentwide system for nonprocurement debarment and suspension. A person who is debarred or suspended shall be excluded from Federal financial and non-financial assistance and benefits under Federal programs and activities. Debarment or suspension of a participant in a program by one agency shall have governmentwide effect.
2. These regulations implement section 3 of Executive Order 12549 and the guidelines promulgated by the Office of Management and Budget under section 6 of the Executive Order by:
 - a. Prescribing the programs and activities that are covered by the governmentwide system;
 - b. Prescribing the governmentwide criteria and governmentwide minimum due process procedures that each agency shall use;
 - c. Providing for the listing of debarred and suspended participants declared ineligible and participants who have voluntarily excluded themselves from participation in covered transactions;
 - d. Setting forth the consequences of a debarment, suspension, determination of ineligibility, or voluntary exclusion; and

- e. Offering such guidance as necessary for the effective implementation and administration of the governmentwide system.
- 3. Although these regulations cover the listing of ineligible participants and the effect of such listing, they do not prescribe policies and procedures governing declarations of ineligibility.

X. INSURANCE /BONDING - INSURANCE DURING CONSTRUCTION

At a minimum, the Contractor agrees to comply with the insurance requirements normally imposed by its State and local governments. *[Refer to General Conditions, Supplementary Conditions and Contract Bond Forms]*

Y. PROJECT SIGNS

The Contractor agrees to cause to be erected at the site of construction, and maintained during construction, signs satisfactory to U.S. DOT identifying the Project and indicating that the Government is participating in the development of the Project. *[Refer to Division 1, General Requirements]*

Z. CERTIFIED PAYROLL - CONSTRUCTION PROJECTS

The Authority shall obtain from each Contractor and subcontractor a certified copy of each weekly payroll within seven days after the regular payroll date. Following a review by the Authority for compliance with State and Federal Labor Laws, the payroll copy shall be retained at the project site for later review by the Federal Transportation Administration. The Contractor must use the Department of Labor Form WH-347 (pages 1 and 2) which provides all the necessary payroll information and certifications or they will be in violation of compliance. A copy of this form is attached as pages 63 and 64 of this Section.

AA. DISADVANTAGED BUSINESS ENTERPRISE

Policy. It is the policy of the Department of Transportation that minority business enterprises, as defined in 49 CFR Part 26, shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with federal funds under this agreement. Consequently, the DBE requirements of 49 CFR Part 26 apply to this agreement.

BB. DBE OBLIGATION

The Authority and its contractors agree to ensure that disadvantaged business enterprises as defined in 49 CFR Part 26 have the opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds provided under this Agreement. In this regard the Authority and its contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that disadvantaged business enterprises have the opportunity to compete for and perform contracts. The Authority and its contractors shall not discriminate on the basis of race, color, national origin or sex in the award and performance of DOT assisted contracts

CC. MINIMUM FEDERAL WAGE RATES

Minimum wages to be paid on this construction project have been established by Wage Predetermination Decisions of the U. S. Secretary of Labor. These wage rates must be prominently posted at the construction site.

1. Wage Determination Decision

Wage predetermination decisions of the U. S. Secretary of Labor are incorporated herein as follows:

- a. MA150001 05/08/2015 MA1 with Modification Nos. 0 through 7 for Middlesex County.

General Decision Number: MA150001 05/08/2015 MA1

Superseded General Decision Number: MA20140001

State: Massachusetts

Construction Type: Building

Counties: Barnstable, Bristol, Dukes, Essex, Middlesex,
Nantucket, Norfolk and Suffolk Counties in Massachusetts.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes and apartments up to and including 4 stories)

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date

0 01/02/2015

1 01/09/2015

2	02/13/2015
3	03/06/2015
4	03/20/2015
5	04/17/2015
6	05/01/2015
7	05/08/2015

ASBE0006-001 09/01/2014

Rates	Fringes
-------	---------

Insulator/asbestos worker

Includes the application
of all insulating
materials, protective
coverings, coatings, and
finishes to all types of
mechanical systems

(ZONE A).....\$ 43.31	24.15
(ZONE B).....\$ 38.98	24.15

ZONES:

ZONE A

BARNSTABLE COUNTY (Brewster, Chatham, Dennis, Eastham,

Harwich, Orleans, Provincetown, Truro, Wellfleet, Yarmouth)

BRISTOL COUNTY (Easton), MIDDLESEX COUNTY, and NORFOLK

COUNTY (Avon, Braintree, Brookline, Canton, Cohasset,

Dedham, Dover, Foxborough, Holbrook, Medfield, Medway,

Millis, Milton, Needham, Norfolk, Norwood, Quincy,

Randolph, Sharon, Stoughton, Walpole, Wellesley, Westwood,

Weymouth)

ZONE B

BARNSTABLE COUNTY (Barnstable, Bourne, Falmouth, Mashpee,

Sandwich), BRISTOL COUNTY (All cities except Easton), and

NORFOLK COUNTY (Bellingham, Franklin, Plainville)

ASBE0006-002 12/01/2014

BARNSTABLE (Brewster, Chatham, Dennis, Eastham, Harwich,

Orleans, Provincetown, Truro, Wellfleet and Yarmouth); BRISTOL

(Easton); ESSEX; MIDDLESEX; NORFOLK (Avon, Braintree,

Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Holbrook,

Hull, Medfield, Medway, Millis, Milton, Needham, Norfolk,

Norwood, Quincy, Randolph, Sharon Stoughton, Walpole,

Wellesley, Westwood, and Weymouth) AND SUFFOLK COUNTIES

Rates Fringes

HAZARDOUS MATERIAL HANDLER

(Includes preparation,
wetting, stripping, removal,
scrapping, vacuuming,
bagging and disposing of all
insulation materials from
mechanical systems whether
they contain asbestos or not)....\$ 31.18 17.80

ASBE0006-010 09/01/2014

BARNSTABLE (Barnstable, Bourne, Falmouth, Mashpee and
Sandwich); BRISTOL (Acushnet, Attleboro city, Berkeley,
Dartmouth, Dighton, Fairhaven, Fall river City, Freetown,
Marion, Mansfield, New Bedford City, North Attleboro, Norton,
Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton City and
Westport); DUKES; NANTUCKET; NORFOLK (Bellingham, Franklin,
Plainville, and Wrentham); PLYMOUTH (Lakeville, Mattapoisett,
Middleboro, Rochester and Wareham)

Rates Fringes

Insulator/asbestos worker

(Includes the application of

all insulating materials,

protective coverings,

coatings and finishes to all

types of mechanical systems.)....\$ 38.98 24.15

BOIL0029-001 10/01/2009

Rates Fringes

BOILERMAKER.....\$ 38.25 17.04

BRMA0001-008 09/01/2013

FOXBORO CHAPTER

BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North

Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton) AND

NORFOLK (Bellingham, Canton, Dedham, Foxboro, Franklin,

Norfolk, Norwood, Plainville, Sharon, Walpole, Westwood,

Wrentham) COUNTIES

Rates Fringes

Bricklayer, Cement Mason,

Plasterer.....\$ 45.96 29.74

BRMA0001-009 09/01/2013

LOWELL CHAPTER

MIDDLESEX (Acton, Asby, Ayer, Bedford, Billerica, Boxboro,

Carlisle, Chemsford, Dracut, Dunstable, Ft. Denvens, Groton,

Littleton, Lowell, North Acton, Pepperell, Shirley, South

Acton, Tewksbury, Townsend, Tyngsboro, West Acton, Westford,

Wilmington)

Rates Fringes

Bricklayer and plasterer.....\$ 45.96 29.74

BRMA0001-010 09/01/2013

LOWELL CHAPTER

MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson,

Maynard, Natick, Sherborn, Stow); and NORFOLK (Medfield,

Medway, Millis)

Rates Fringes

BRICKLAYER.....\$ 45.96 29.74

BRMA0003-001 08/01/2014

Rates Fringes

Marble & Tile Finisher.....\$ 37.37 27.20

Marble, Tile & Terrazzo

Workers.....\$ 49.00 28.72

TERRAZZO FINISHER.....\$ 47.90 28.55

BRMA0003-003 08/01/2014

BOSTON CHAPTER

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford,

Melrose, Somerville); NORFOLK (Brookline, Milton); and SUFFOLK

Rates Fringes

BRICKLAYER.....\$ 48.96 28.77

BRMA0003-006 08/01/2014

LYNN CHAPTER

ESSEX (Amesbury, Andover, Beverly, Boxford, Danvers, Essex,
Georgetown, Gloucester, Groveland, Hamilton, Haverhill,
Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead,
Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport,
North Andover, Peabody, Rockport, Rowley, Salisbury, Salem,
Saugus, Swampscott, Topsfield Wakefield, Wenham, West Newbury);
and MIDDLESEX (Reading, North Reading, Wakefield)

	Rates	Fringes
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Bricklayer, cement mason and plasterer.....	\$ 48.96	28.77
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BRMA0003-007 08/01/2014

WALTHAM CHAPTER

MIDDLESEX (Belmont, Burlington, Concord, Lexington, Lincoln,
Stoneham, Sudbury, Waltham, Watertown, Wayland, Weston,
Winchester, Woburn)

	Rates	Fringes
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Bricklayer and plasterer.....\$ 48.96 28.77

BRMA0003-008 08/01/2014

NEWTON CHAPTER

MIDDLESEX (Newton) and NORFOLK (Dover, Needham, Wellesley)

Rates Fringes

Bricklayer, cement mason and
plasterer.....\$ 48.96 28.77

BRMA0003-009 08/01/2014

NEW BEDFORD

BARNSTABLE; BRISTOL (Acushnet, Dartmouth, Fairhaven, Fall River,
Freetown, New Bedford, Somerset, Swansea, Westport); DUKES; and
NANTUCKET COUNTIES

Rates Fringes

Bricklayer, cement mason and

plasterer.....\$ 48.96 28.77

BRMA0003-010 08/01/2014

QUINCY CHAPTER

NORFOLK COUNTY (Avon, Braintree, Cohasset, Holbrook, Quincy,
Randolph, Soughton, Weymouth)

Rates Fringes

Bricklayer, cement mason and

plasterer.....\$ 48.96 28.77

CARP0026-001 03/01/2015

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX

(Except Belmont, Cambridge, Everett, Malden, Medford,

Somerville); AND NORFOLK (Bellingham, Canton, Foxboro,

Franklin, Medfield, Medway, Millis, Needham, Norfolk, Norwood,

Plainville, Sharon, Walpole, Wellesley, Westwood, Wrentham)

Rates Fringes

CARPENTER.....\$ 35.75 26.88

CARP0033-001 03/01/2015

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford,
Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

Rates Fringes

CARPENTER.....\$ 42.30 27.38

CARP0056-011 08/01/2013

SUFFOLK (All of County); and those areas of BARNSTABLE,
BRISTOL, ESSEX, MIDDLESEX & NORFOLK COUNTIES situated inside
Boston Beltway (I-495) and North of Cape Cod Canal. ALL of
DUKES AND NANTUCKET COUNTIES

Rates Fringes

PILEDRIVERMAN.....\$ 40.10 28.57

CARP0056-012 08/01/2013

The areas of BARNSTABLE, BRISTOL, and NORFOLK COUNTIES situated
OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
--	-------	---------

PILEDRIVERMAN.....	\$ 40.10	28.57
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CARP0056-013 08/01/2013

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE
Boston Beltway (I-495)

	Rates	Fringes
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PILEDRIVERMAN.....	\$ 40.10	28.57
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CARP0424-003 03/01/2015

NORFOLK COUNTY (Braintree, Cohasset, Scituate, Weymouth,
Quincy)

Rates Fringes

CARPENTER.....\$ 35.75 26.88

CARP0624-005 03/01/2015

DUKES; NANTUCKET

Rates Fringes

CARPENTER.....\$ 42.30 27.38

CARP0624-007 03/01/2015

BARNSTABLE; BRISTOL (Except Attleboro & North Attleboro); AND
NORFOLK (Avon, Holbrook, Randolph, Stoughton) COUNTIES

Rates Fringes

CARPENTER.....\$ 35.75 26.88

* CARP1121-001 04/01/2015

Rates Fringes

MILLWRIGHT.....\$ 36.64 27.88

CARP2168-001 09/01/2014

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford,
Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

Rates Fringes

FLOOR LAYER: Carpet.....\$ 40.40 27.61

CARP2168-004 09/01/2014

BRISTOL; ESSEX; MIDDLESEX (Except Belmont, Cambridge, Everett,
Malden, Medford, Somerville); Remainder of Norfolk County

Rates Fringes

FLOOR LAYER: Carpet.....\$ 40.40 27.61

CARP2168-005 09/01/2014

BARNSTABALE; DUKES; AND NANTUCKET

Rates Fringes

FLOOR LAYER: Carpet.....\$ 40.40 27.61

ELEC0096-001 12/01/2014

MIDDLESEX (Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton,
Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend)

Rates Fringes

ELECTRICIAN.....\$ 38.37 14%+16.41

Teledata System Installer.....\$ 26.25 3%+18.87

ELEC0099-001 12/01/2014

BRISTOL (Attleboro, North Attleboro, Seekonk)

Rates Fringes

ELECTRICIAN.....\$ 35.33 60.73%

Teledata System Installer.....\$ 26.50 13.87%+13.57

ELEC0103-001 03/01/2015

ESSEX; MIDDLESEX (Excluding Ashby, Ashland, Ayer, Ft. Devens,
Groton, Hopkinton, Hudson, Marlboro, Pepperell, Shirley, Stow,
Townsend); NORFOLK (Excluding Avon, Holbrook, Plainville,
Randolph, Stoughton) SUFFOLK

	Rates	Fringes
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Teledata System Installer.....	\$ 33.88	27.21
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ELEC0103-002 03/01/2015

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland,
Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport,
North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX
(Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford,
Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury,
Tyngsboro, Westford, Wilmington)

	Rates	Fringes
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ELECTRICIAN.....\$ 45.17 29.08

ELEC0103-004 03/01/2015

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich,
Manchester, Marblehead, Middleton, Peabody, Rockport, Salem,
Topsfield, Wenham)

Rates Fringes

ELECTRICIAN.....\$ 45.17 29.08

ELEC0103-005 03/01/2015

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX
(Acton, Arlington, Belmont, Cambridge, Concord, Everett,
Framingham, Holliston, Lexington, Lincoln, Malden, Maynard,
Medford, Melrose, Natick, Newton, Reading, Sherborn,
Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown,
Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham,
Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro,
Franklin, Medfield, Medway, Millis, Milton, Needham, Norfolk,
Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood,
Weymouth, Wrentham); PLYMOUTH (Hingham and Hull); SUFFOLK

Rates Fringes

ELECTRICIAN.....\$ 45.17 29.08

ELEC0104-001 08/31/2014

Rates Fringes

Line Construction:

Cableman.....\$ 43.51 21.64+A

Equipment Operator.....\$ 36.98 18.93+A

Groundman.....\$ 23.93 12.26+A

Lineman.....\$ 43.51 21.64+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day;
Independence Day; Labor Day; Thanksgiving Day; Christmas
Day and Columbus Day, provided the employee has been
employed 5 working days prior to any one of the listed
holidays.

ELEC0223-005 09/01/2014

BARNSTABLE; BRISTOL (Except Attleboro, North Attleboro,
Seekonk); DUKES; NANTUCKET AND NORFOLK (Avon, Halbrook,
Plainville, Randolph, Stoughton)

Rates Fringes

ELECTRICIAN.....\$ 37.31 27.75%+9.70

ELEC0223-006 09/01/2014

BARNSTABLE; BRISTOL (Except Attleboro, North Attleboro,
Seekonk); DUKES; NANTUCKET AND NORFOLK (Avon, Halbrook,
Plainville, Randolph, Stoughton)

Rates Fringes

Teledata System Installer.....\$ 37.31 27.75%+9.70

ELEV0004-001 01/01/2015

Rates Fringes

ELEVATOR MECHANIC.....\$ 53.30 28.385+a+b

FOOTNOTE FOR ELEVATOR MECHANICS:

a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

ENGI0004-001 12/01/2014

Rates Fringes

Power equipment operators:

Group 1.....	\$ 42.39	25.14+A
Group 2.....	\$ 41.99	25.14+A
Group 3.....	\$ 29.40	25.14+A
Group 4.....	\$ 35.33	25.14+A
Group 5.....	\$ 21.90	25.14+A
Group 6.....	\$ 25.54	25.14+A

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday,

Labor Day, Memorial Day, Independence Day, Patriot's Day,
Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):

Over 150 ft. +2.12

Over 185 ft. +3.72

Over 210 ft. +5.23

Over 250 ft. +7.92

Over 295 ft. +10.97

Over 350 ft. +12.76

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

Group 1: Crane; shovel; truck crane; cherry picker;
dragline; trench hoe; backhoe; three drum machine; derrick;
pile driver; elevator tower; hoist; gradall; shovel dozer;
front end loader; fork lift; suger; boring machine; rotaryu
drill; post hole hammer; post hole digger; pumpcrete
machine; asphalt plant (on site); concrete batching and/or
mixing plant (on site); crusher plant (on site); paving
concrete mixer; timber jack

Group 2: Sonic or vibratory hammer; grader; scraper; tandem
scraper; concrete pump; bulldozer; tractor; york rake;
mulching machine; portable steam boiler; portable steam
generator; roller; spreader; tamper (self propelled or
tractor drawn); asphalt paver; mechanic - maintenance;

paving screed machine; stationary steam boiler; paving
concrete finishing machine; cal truck; ballast regulator;
switch tamper; rail anchor machine; tire truck

Group 3: Pumps (1-3 grouped); compressor; welding machine
(1-3 grouped); generator; concrete vibrator; heater (power
driven 1- 5); well point system (operating);
syphon-pulsometer; concrete mixer; valves controlling
permanent plant air or steam; conveyor; Jackson type
tamper; single diaphragm pump; lighting plant

Group 4: Assistant engineer (fireman)

Group 5: Oiler (other than truck cranes and gradalls)

Group 6: Oiler (on truck cranes and gradalls) stant engineer
(on truck crane and gradall)

IRON0007-006 03/16/2015

AREA 1: BRISTOL (Easton); ESSEX (Beverly, Gloucester,
Lynn, Lynnfield, Manchester, Marblehead, Nahant, Rockport,
Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford,
Belmont, Burlington, Cambridge, Carlisle, Concord, Dunstable,
Everett, Framingham, Lexington, Lincoln, Malden, Maynard,
Medford, Melrose, Natick, Newton, Reading, Sherborn,
Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown,
Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway);

SUFFOLK

AREA 2: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex,
Georgetown, Hamilton, Haverhill, Ipswich, Lawrence, Merrimac,
Methuen, Newbury, Newburyport, North Andover, Rowley,
Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action,
Billerica, Chelmsford, Dracut, Groton, Groveland, Littleton,
Lowell, Middleton, North Reading, Pepperell, Tewksbury,
Tyngsboro, Westford, Wilmington)

	Rates	Fringes
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Ironworkers:

AREA 1.....	\$ 42.11	28.67
AREA 2.....	\$ 37.70	28.67

IRON0007-010 03/16/2015

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton,
Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

	Rates	Fringes
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IRONWORKER.....\$ 41.81 28.67

IRON0037-005 03/16/2014

BARNSTABLE; BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth,
Dighton, Fairhaven, Fall River, Freetown, Mansfield, New
Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk,
Somerset, Swansea, Taunton, Westport); DUKES; NANTUCKET;
NORFOLK (Billingham, Franklin, Plainville, Wrentham)

Rates Fringes

IRONWORKER.....\$ 33.56 22.77

LABO0014-001 06/01/2011

Rates Fringes

Plasterer tender

BARNSTABLE, BRISTOL,
DUKES, ESSEX, NANTUCKET,
MIDDLESEX (with the
exception of Arlington,
Belmont, Burlington,

Cambridge, Everett,
 Malden, Medford, Melrose,
 Reading, Somerville,
 Stoneham, Wakefield,
 Winchester, Winthrop and
 Woburn); NORFOLK (with the
 exception of Brookline
 Dedham and Milton) COUNTIES.\$ 28.60 19.00
 SUFFOLK COUNTY (Boston,
 Chelsea, Revere, Winthrop,
 Deer Island, Nut Island);
 MIDDLESEX COUNTY
 (Arlington, Belmont,
 Burlington, Cambridge,
 Everett, Malden, Medford,
 Melrose, Reading,
 Somerville, Stoneham,
 Wakefield, Winchester,
 Winthrop and Woburn only);
 NORFOLK COUNTY (Brookline,
 Dedham, and Milton only)....\$ 31.05 19.90

LABO0022-009 12/01/2012

SUFFOLK COUNTY (Boston, Chelsea, Revere, Winthrop, Deer & Nut

Islands); MIDDLESEX COUNTY (Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop, and Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton only)

	Rates	Fringes
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Laborers:

Group 1.....	\$ 32.30	20.40
Group 2.....	\$ 32.55	20.40
Group 3.....	\$ 33.05	20.40
Group 4.....	\$ 33.30	20.40
Group 5.....	\$ 33.05	20.40
Group 6.....	\$ 34.30	20.40
Group 7.....	\$ 20.50	20.40

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; Carpenter Tenders

GROUP 2: Jackhammer operator; pavement breaker; asphalt raker carbide core drilling machine; chain saw operator; pipelayer; barco type jumping tampers; laser beam; concrete

pump; mason tender; motorized mortar mixer; ride-on
motorized buggy; fence and beam rail erector

GROUP 3: Air track, block paver; rammer; curb setter,
hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Pre-cast floor and roof plank erector

GROUP 6: Asbestos removal laborers/haz-mat laborers

GROUP 7: Flaggers

LABO0022-010 12/01/2012

Counties of BARNSTABLE; BRISTOL; DUKES; ESSEX; NANTUCKET;
MIDDLESEX (with the exception of Arlington, Belmont,
Burlington, Cambridge, Everett, Malden, Medford, Melrose,
Reading, Somerville, Stoneham, Wakfield, Winchester, Winthrop
and Woburn); NORFOLK (with the exception of Brookline, Dedham
and Milton)

Rates Fringes

Laborers:

Group 1.....	\$ 29.60	19.50
Group 2.....	\$ 29.85	19.50
Group 3.....	\$ 30.35	19.50
Group 4.....	\$ 30.60	19.50
Group 5.....	\$ 30.35	19.50
Group 6.....	\$ 31.60	19.50

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; Carpenter Tenders

GROUP 2: Jackhammer operator; pavement breaker; asphalt
raker carbide core drilling machine; chain saw operator;
pipelayer; barco type jumping tampers; laser beam; concrete
pump; mason tender; motorized mortar mixer; ride-on
motorized buggy; fence and beam rail erector

GROUP 3: Air track, block paver; hammer; curb setter,
hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Pre-cast floor and roof plank erector

GROUP 6: Asbestos removal laborers/haz-mat laborers

LABO1421-004 06/01/2014

BARNSTABLE, BRISTOL, DUKES, ESSEX, MIDDLESEX, NANTUCKET NORFOLK
AND SUFFOLK COUNTIES

Rates Fringes

Laborers: (Wrecking)

Group 1.....	\$ 34.25	20.85
Group 2.....	\$ 35.00	20.85
Group 3.....	\$ 35.25	20.85
Group 4.....	\$ 30.25	20.85
Group 5.....	\$ 33.35	20.85
Group 6.....	\$ 34.25	20.85

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type

Loaders, Hydraulic "Brock" Type Hammer Operators, Concrete

Cutting Saws.

Group 4: Yardman (Salvage Yard Only).

Group 5: Yardman, Burners, Sawyers.

Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0011-007 06/01/2014

BARNSTABLE, BRISTOL, DUKES, AND NANTUCKET COUNTIES

	Rates	Fringes
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GLAZIER.....	\$ 34.58	18.55+A
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FOOTNOTE:

A. PAID HOLIDAY: LABOR DAY (provided employee has worked any part of the week prior to Labor Day and any part of the week after Labor Day)

PAIN0035-004 01/01/2015

BARNSTABLE; BRISTOL; ESSEX; NANTUCKET; DUKES; COUNTIES;

REMAINDER OF NORFOLK; MIDDLESEX AND SUFFOLK COUNTIES

Rates Fringes

Painters:

NEW CONSTRUCTION:

Brush, Taper.....\$ 36.26 25.95

Spray, Sandblast.....\$ 37.66 25.95

REPAINT:

Brush, Taper.....\$ 34.32 25.95

Spray, Sandblast.....\$ 35.72 25.95

PAIN0035-013 01/01/2015

MIDDLESEX (Cambridge, Everett, Malden, Medford, Somerville)

SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

Rates Fringes

Painters:

NEW CONSTRUCTION:

Brush, Taper.....\$ 42.05 25.95

Spray, Sandblast.....\$ 43.45 25.95

REPAINT:

Brush, Taper.....\$ 40.11 25.95

Spray, Sandblast.....\$ 41.51 25.95

PAIN0035-020 01/01/2015

ESSEX; MIDDLESEX; NORFOLK; SUFFOLK

Rates Fringes

GLAZIER.....\$ 36.26 25.95

PLAS0534-001 07/01/2014

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 37.25 32.26

PLAS0534-004 07/01/2014

MIDDLESEX; NORFOLK AND SUFFOLK COUNTIES

Rates Fringes

PLASTERER.....\$ 37.25 32.26

PLUM0004-001 09/01/2014

MIDDLESEX (Ashby, Ayer-West of Greenville branch of Boston and
Maine Railroad, Ft. Devens, Groton, Shirley, Townsend)

Rates Fringes

Plumbers and Pipefitters.....\$ 41.11 24.71

PLUM0012-005 09/01/2013

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,
Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,
Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen,
Middleton, Newbury, Newburyport, North Andover, Peabody,
Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West
Newbury)

Rates Fringes

PLUMBER.....\$ 44.98 24.56

PLUM0012-007 09/01/2013

ESSEX (Lynn, Lynnfield, Nahant, Saugus, and Swampscott);
MIDDLESEX (Acton, Arlington, Ashford, Ayer-except west of
Greenville Branch of Boston & Maine Rail Road, Bedford,
Belmont, Billerica, Boxboro, Burlington, Cambridge, Carlise,
Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,
Hudson, Holliiston, Hopkinton, Lexington, Lincoln, Littleton,
Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,
Newton, North Reading, Pepperell, Reading, Sherborn,
Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,
Wakefield, Watham, Watertown, Wayland, Westford, Wilmington,
Winchester and Woburn), NORFOLK (Bellingham, Braintree,
Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,
Medford, Medway, Millis, Milton, Needham, Norfolk, Norwood,
Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,
Weymouth and Wrentham); PLYMOUTH (Hingham, Hull, Scituate);
SUFFOLK; WORCESTER (Hopedale and Southboro)

	Rates	Fringes
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PLUMBER.....	\$ 49.06	24.56
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PLUM0051-004 03/01/2014

BARNSTABLE; BRISTOL; DUKES; NANTUCKET; AND NORFOLK (Avon,
Holbrook, Randolph, Stoughton) COUNTIES

	Rates	Fringes
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Plumbers and Pipefitters.....	\$ 35.51	27.32
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PLUM0537-005 03/01/2015

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,
Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,
Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead,
Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport,
North Andover, Peabody, Rockport, Rowley, Salem, Salisbury,
Saugus, Swampscott, Topsfield, Wenham, West Newbury); MIDDLESEX
(Acton, Arlington, Ashford, Ayer-except west of Greenville
Branch of Boston & Maine Rail Road, Bedford, Belmont,
Billerica, Boxboro, Burlington, Cambridge, Carlisle,
Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,
Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton,
Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,
Newton, North Reading, Pepperell, Reading, Sherborn,
Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,

Wakefield, Watham, Watertown, Wayland, Westford, Wilmington,
 Winchester and Woburn), NORFOLK (Bellingham, Braintree,
 Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,
 Medford, Medway, Millis, Milton, Needham, Norfolk, Norwood,
 Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,
 Weymouth and Wrentham); PLYMOUTH (Hingham, Hull, Scituate);
 SUFFOLK; WORCHESTER (Hopedale and Southboro)

	Rates	Fringes
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PIPEFITTER.....	\$ 49.69	27.76
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 ROOF0033-001 08/01/2014

	Rates	Fringes
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Roofers:

All Tear-off and/or
 removal of any types of
 roofing and all spudding,
 sweeping, vacuuming and/or
 cleanup of any and all
 areas of any type where a

roof is to be relaid.....	\$ 39.21	22.92
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SFMA0550-001 01/01/2014

BRISTOL (Portion within 35 mile radius from Boston City Hall;
ESSEX; MIDDLESEX (Except Ashby, Townsend, and portions of
Pepperell and Shirley beyond 35 mile radius from Boston City
Hall); NORFOLK; PLYMOUTH (Portion within 35 mile radius of
Boston City Hall); SUFFOLK

	Rates	Fringes
SPRINKLER FITTER.....	\$ 53.33	22.08

SFMA0550-002 01/01/2014

BRISTOL (Seekonk, Swansea, and Somerset)

	Rates	Fringes
SPRINKLER FITTER.....	\$ 39.40	21.05+a

a. PAID HOLIDAYS: Memorial Day, July 4th, Labor Day,
Thanksgiving Day and Christmas Day, provided the employee
has been in the employment of a contractor 20 working days

prior to any such paid holiday.

SFMA0669-001 01/01/2014

BARNSTABLE; BRISTOL (Beyond 35 mile radius of Boston City Hall); DUKES; MIDDLESEX (Ashby, Townsend, portions of Pepperell and Shirley beyond 35 mile radius of Boston City Hall); NANTUCKET; PLYMOUTH (Beyond 35 mile radius of Boston City Hall)

	Rates	Fringes
SPRINKLER FITTER.....	\$ 39.40	21.05

SHEE0017-003 02/01/2012

BRISTOL (Attleboro, Berkley, Easton, Mansfield, North Attleboro, Norton, Raynham, Taunton); ESSEX; MIDDLESEX; NORFOLK; PLYMOUTH (except except Marion, Mattapoisett, Rochester, Wareham); SUFFOLK

	Rates	Fringes
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Sheet metal worker.....\$ 40.79 28.83

SHEE0017-007 02/01/2012

BARNSTABLE; BRISTOL (Acushnet, Assonet, Dartmouth, Dighton,
Fairhaven, Fall River, Freetown, New Bedford, Rehoboth,
Seekonk, Somerset, Swansea, Westport); DUKES; AND NANTUCKET

Rates Fringes

Sheet metal worker.....\$ 40.79 28.83

TEAM0379-001 08/01/2013

Rates Fringes

Truck drivers:

Group 1.....	\$ 30.78	18.37+A+B
Group 2.....	\$ 30.95	18.37+A+B
Group 3.....	\$ 31.02	18.37+A+B
Group 4.....	\$ 31.14	18.37+A+B
Group 5.....	\$ 31.24	18.37+A+B
Group 6.....	\$ 31.53	18.37+A+B
Group 7.....	\$ 31.82	18.37+A+B

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE

TUNNEL WORK (UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE

HAZARDOUS MATERIALS (IN HOT ZONE ONLY) \$2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons

other than conventional type trucks; low bed; vachual;

mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday,
Memorial Day, Independence Day, Labor Day, Patriot's Day,
Columbus Day, Veteran's Day, Thanksgiving Day and Christmas
Day

B. PAID VACATION: Employees with 4 months to 1 year of
service receive 1/2 day's pay per month; 1 week vacation
for 1 - 5 years of service; 2 weeks vacation for 5 - 10
years of service; and 3 weeks vacation for more than 10
years of service

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number,

005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

DD. EQUAL EMPLOYMENT OPPORTUNITY (EEO)

**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS
(EXECUTIVE ORDER NO. 11246):**

1. AS USED IN THESE SPECIFICATIONS:

- a. "COVERED AREA" MEANS THE GEOGRAPHICAL AREA DESCRIBED IN THE SOLICITATION FROM WHICH THIS CONTRACT RESULTED;
- b. "DIRECTOR" MEANS DIRECTOR, OFFICE OF FEDERAL CONTRACT COMPLIANCE PROGRAMS, UNITED STATES DEPARTMENT OF LABOR, OR ANY PERSON TO WHOM THE DIRECTOR DELEGATES AUTHORITY;
- c. "EMPLOYER IDENTIFICATION NUMBER" MEANS THE FEDERAL SOCIAL SECURITY NUMBER USED ON THE EMPLOYER'S QUARTERLY FEDERAL TAX RETURN, U.S. TREASURY DEPARTMENT FORM 941;
- d. "MINORITY" INCLUDES:
 - (i) BLACK (ALL PERSONS HAVING ORIGINS IN ANY OF THE BLACK AFRICAN RACIAL GROUPS NOT OF HISPANIC ORIGIN);
 - (ii) HISPANIC (ALL PERSONS OF MEXICAN, PUERTO RICAN, CUBAN, CENTRAL OR SOUTH AMERICAN, OR OTHER SPANISH CULTURE OR ORIGIN, REGARDLESS OF RACE);
 - (iii) ASIAN AND PACIFIC ISLANDER (ALL PERSONS HAVING ORIGINS IN ANY OF THE ORIGINAL PEOPLES OF THE FAR EAST, SOUTHEAST ASIA, THE INDIAN SUBCONTINENT, OR THE PACIFIC ISLANDS); AND
 - (iv) AMERICAN INDIAN OR ALASKAN NATIVE (ALL PERSONS HAVING ORIGINS IN ANY OF THE ORIGINAL PEOPLES OF NORTH AMERICA AND MAINTAINING IDENTIFIABLE TRIBAL AFFILIATIONS THROUGH MEMBERSHIP AND PARTICIPATION OR COMMUNITY IDENTIFICATION).

- 2. WHENEVER THE CONTRACTOR, OR SUBCONTRACTOR AT ANY TIER, SUBCONTRACTS A PORTION OF THE WORK INVOLVING ANY CONSTRUCTION TRADE, IT SHALL PHYSICALLY INCLUDE IN EACH SUBCONTRACT IN EXCESS OF \$10,000 THE PROVISIONS OF THESE SPECIFICATIONS AND THE NOTICE WHICH CONTAINS THE APPLICABLE GOALS FOR MINORITY AND FEMALE PARTICIPATION AND WHICH IS SET FORTH IN THE SOLICITATIONS FROM WHICH THIS CONTRACT RESULTED.
- 3. IF THE CONTRACTOR IS PARTICIPATING (PURSUANT TO 41 C.F.R. § 60-4.5) IN A HOMETOWN PLAN APPROVED BY THE U. S. DEPARTMENT OF LABOR IN THE COVERED AREA, EITHER INDIVIDUALLY OR THROUGH AN ASSOCIATION, ITS AFFIRMATIVE ACTION OBLIGATIONS ON ALL WORK IN THE PLAN AREA (INCLUDING GOALS AND TIMETABLES) SHALL BE IN ACCORDANCE WITH THAT PLAN FOR THOSE TRADES WHICH HAVE UNIONS PARTICIPATING IN THE PLAN. CONTRACTORS MUST BE ABLE TO DEMONSTRATE THEIR PARTICIPATION IN AND COMPLIANCE WITH THE PROVISIONS OF ANY SUCH HOMETOWN

PLAN. EACH CONTRACTOR OR SUBCONTRACTOR PARTICIPATING IN AN APPROVED PLAN IS INDIVIDUALLY REQUIRED TO COMPLY WITH ITS OBLIGATIONS UNDER THE EEO CLAUSE, AND TO MAKE A GOOD FAITH EFFORT TO ACHIEVE EACH GOAL UNDER THE PLAN IN EACH TRADE IN WHICH IT HAS EMPLOYEES. THE OVERALL GOOD FAITH PERFORMANCE BY OTHER CONTRACTORS OR SUBCONTRACTORS TOWARD A GOAL IN AN APPROVED PLAN DOES NOT EXCUSE ANY COVERED CONTRACTOR'S OR SUBCONTRACTOR'S FAILURE TO MAKE GOOD FAITH EFFORTS TO ACHIEVE THE PLAN GOALS AND TIMETABLES.

4. THE CONTRACTOR SHALL IMPLEMENT THE SPECIFIC AFFIRMATIVE ACTION STANDARDS PROVIDED IN PARAGRAPHS (7)(a) THROUGH (p) OF THESE SPECIFICATIONS. THE GOALS SET FORTH IN THE SOLICITATION FROM WHICH THIS CONTRACT RESULTED ARE EXPRESSED AS PERCENTAGES OF THE TOTAL HOURS OF EMPLOYMENT AND TRAINING OF MINORITY AND FEMALE UTILIZATION THE CONTRACTOR SHOULD REASONABLY BE ABLE TO ACHIEVE IN EACH CONSTRUCTION TRADE IN WHICH IT HAS EMPLOYEES IN THE COVERED AREA. COVERED CONSTRUCTION CONTRACTORS PERFORMING CONSTRUCTION WORK IN GEOGRAPHICAL AREAS WHERE THEY DO NOT HAVE A FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION CONTRACT SHALL APPLY THE MINORITY AND FEMALE GOALS ESTABLISHED FOR THE GEOGRAPHICAL AREA WHERE THE WORK IS BEING PERFORMED. GOALS ARE PUBLISHED PERIODICALLY IN THE FEDERAL REGISTER IN NOTICE FORM, AND SUCH NOTICES MAY BE OBTAINED FROM ANY OFFICE OF FEDERAL CONTRACT COMPLIANCE PROGRAMS OFFICE OR FROM FEDERAL PROCUREMENT CONTRACTING OFFICERS. THE CONTRACTOR IS EXPECTED TO MAKE SUBSTANTIALLY UNIFORM PROGRESS TOWARD ITS GOAL IN EACH CRAFT DURING THE PERIOD SPECIFIED.
5. NEITHER THE PROVISIONS OF ANY COLLECTIVE BARGAINING AGREEMENT, NOR THE FAILURE BY A UNION WITH WHOM THE CONTRACTOR HAS A COLLECTIVE BARGAINING AGREEMENT TO REFER EITHER MINORITIES OR WOMEN SHALL EXCUSE THE CONTRACTOR'S OBLIGATIONS UNDER THESE SPECIFICATIONS, EXECUTIVE ORDER NO. 11246, OR THE REGULATIONS PROMULGATED PURSUANT THERETO.
6. IN ORDER FOR THE NONWORKING TRAINING HOURS OF APPRENTICES AND TRAINEES TO BE COUNTED IN MEETING THE GOALS, SUCH APPRENTICES AND TRAINEES MUST BE EMPLOYED BY THE CONTRACTOR DURING THE TRAINING PERIOD, AND THE CONTRACTOR MUST HAVE MADE A COMMITMENT TO EMPLOY THE APPRENTICES AND TRAINEES AT THE COMPLETION OF THEIR TRAINING, SUBJECT TO THE AVAILABILITY OF EMPLOYMENT OPPORTUNITIES. TRAINEES MUST BE TRAINED PURSUANT TO TRAINING PROGRAMS APPROVED BY THE U.S. DEPARTMENT OF LABOR.
7. THE CONTRACTOR SHALL TAKE SPECIFIC AFFIRMATIVE ACTIONS TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY. THE EVALUATION OF THE CONTRACTOR'S COMPLIANCE WITH THESE SPECIFICATIONS SHALL BE BASED UPON ITS EFFORT TO ACHIEVE MAXIMUM RESULTS FROM ITS ACTIONS. THE CONTRACTOR SHALL DOCUMENT THESE EFFORTS FULLY, AND SHALL IMPLEMENT AFFIRMATIVE ACTION STEPS AT LEAST AS EXTENSIVE AS THE FOLLOWING:
 - a. ENSURE AND MAINTAIN A WORKING ENVIRONMENT FREE OF HARASSMENT, INTIMIDATION, AND COERCION AT ALL SITES, AND IN ALL FACILITIES AT WHICH THE CONTRACTOR'S EMPLOYEES ARE ASSIGNED TO WORK. THE CONTRACTOR, WHERE POSSIBLE, WILL ASSIGN TWO OR MORE WOMEN TO EACH CONSTRUCTION PROJECT. THE CONTRACTOR SHALL SPECIFICALLY ENSURE THAT ALL FOREMEN, SUPERINTENDENTS, AND OTHER ON-SITE SUPERVISORY PERSONNEL ARE AWARE OF

AND CARRY OUT THE CONTRACTOR'S OBLIGATION TO MAINTAIN SUCH A WORKING ENVIRONMENT, WITH SPECIFIC ATTENTION TO MINORITY OR FEMALE INDIVIDUALS WORKING AT SUCH SITES OR IN SUCH FACILITIES.

- b. ESTABLISH AND MAINTAIN A CURRENT LIST OF MINORITY AND FEMALE RECRUITMENT SOURCES, PROVIDE WRITTEN NOTICE TO MINORITY AND FEMALE RECRUITMENT SOURCES AND TO COMMUNITY ORGANIZATIONS WHEN THE CONTRACTOR OR ITS UNIONS HAVE EMPLOYMENT OPPORTUNITIES AVAILABLE, AND MAINTAIN A RECORD OF THE ORGANIZATIONS' RESPONSES.
- c. MAINTAIN A CURRENT FILE OF THE NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF EACH MINORITY AND FEMALE OFF-THE-STREET APPLICANT AND MINORITY OR FEMALE REFERRAL FROM A UNION, A RECRUITMENT SOURCE OR COMMUNITY ORGANIZATION AND OF WHAT ACTION WAS TAKEN WITH RESPECT TO EACH SUCH INDIVIDUAL. IF SUCH INDIVIDUAL WAS SENT TO THE UNION HIRING HALL FOR REFERRAL AND WAS NOT REFERRED BACK TO THE CONTRACTOR BY THE UNION OR, IF REFERRED, NOT EMPLOYED BY THE CONTRACTOR, THIS SHALL BE DOCUMENTED IN THE FILE WITH THE REASON THEREFOR, ALONG WITH WHATEVER ADDITIONAL ACTIONS THE CONTRACTOR MAY HAVE TAKEN.
- d. PROVIDE IMMEDIATE WRITTEN NOTIFICATION TO THE DIRECTOR WHEN THE UNION OR UNIONS WITH WHICH THE CONTRACTOR HAS A COLLECTIVE BARGAINING AGREEMENT HAS NOT REFERRED TO THE CONTRACTOR A MINORITY PERSON OR WOMAN SENT BY THE CONTRACTOR, OR WHEN THE CONTRACTOR HAS OTHER INFORMATION THAT THE UNION REFERRAL PROCESS HAS IMPEDED THE CONTRACTOR'S EFFORTS TO MEET ITS OBLIGATIONS.
- e. DEVELOP ON-THE-JOB OPPORTUNITIES AND/OR PARTICIPATE IN TRAINING PROGRAMS FOR THE AREA WHICH EXPRESSLY INCLUDE MINORITIES AND WOMEN, INCLUDING UPGRADING PROGRAMS AND APPRENTICESHIP AND TRAINEE PROGRAMS RELEVANT TO THE CONTRACTOR'S EMPLOYMENT NEEDS, ESPECIALLY THOSE PROGRAMS FUNDED OR APPROVED BY THE DEPARTMENT OF LABOR. THE CONTRACTOR SHALL PROVIDE NOTICE OF THESE PROGRAMS TO THE SOURCES COMPILED UNDER (7)(b) ABOVE.
- f. DISSEMINATE THE CONTRACTOR'S EEO POLICY BY PROVIDING NOTICE OF THE POLICY TO UNIONS AND TRAINING PROGRAMS AND REQUESTING THEIR COOPERATION IN ASSISTING THE CONTRACTOR IN MEETING ITS EEO OBLIGATIONS; BY INCLUDING IT IN ANY POLICY MANUAL AND COLLECTIVE BARGAINING AGREEMENT; BY PUBLICIZING IT IN THE COMPANY NEWSPAPER, ANNUAL REPORT, ETC.; BY SPECIFIC REVIEW OF THE POLICY WITH ALL MANAGEMENT PERSONNEL AND WITH ALL MINORITY AND FEMALE EMPLOYEES AT LEAST ONCE A YEAR; AND BY POSTING THE COMPANY EEO POLICY ON BULLETIN BOARDS ACCESSIBLE TO ALL EMPLOYEES AT EACH LOCATION WHERE CONSTRUCTION WORK IS PERFORMED.
- g. REVIEW, AT LEAST ANNUALLY, THE COMPANY'S EEO POLICY AND AFFIRMATIVE ACTION OBLIGATIONS UNDER THESE SPECIFICATIONS WITH ALL EMPLOYEES HAVING RESPONSIBILITY FOR HIRING, ASSIGNMENT, LAYOFF, TERMINATION OR OTHER EMPLOYMENT DECISIONS INCLUDING SPECIFIC REVIEW OF THESE ITEMS WITH ON-SITE SUPERVISORY PERSONNEL SUCH AS SUPERINTENDENTS, GENERAL FOREMAN, ETC., PRIOR TO THE INITIATION OF CONSTRUCTION WORK AT ANY JOB SITE. A WRITTEN RECORD SHALL BE MADE AND MAINTAINED IDENTIFYING THE TIME AND

PLACE OF THESE MEETINGS, PERSONS ATTENDING, SUBJECT MATTER DISCUSSED, AND DISPOSITION OF THE SUBJECT MATTER.

- h. DISSEMINATE THE CONTRACTOR'S EEO POLICY EXTERNALLY BY INCLUDING IT IN ANY ADVERTISING IN THE NEWS MEDIA, SPECIFICALLY INCLUDING MINORITY AND FEMALE NEWS MEDIA, AND PROVIDING WRITTEN NOTIFICATION TO AND DISCUSSING THE CONTRACTOR'S EEO POLICY WITH OTHER CONTRACTORS AND SUBCONTRACTORS WITH WHOM THE CONTRACTOR DOES OR ANTICIPATES DOING BUSINESS.
- i. DIRECT RECRUITMENT EFFORTS, BOTH ORAL AND WRITTEN, TO MINORITY, FEMALE, AND COMMUNITY ORGANIZATIONS, TO SCHOOLS WITH MINORITY AND FEMALE STUDENTS AND TO MINORITY AND FEMALE RECRUITMENT AND TRAINING ORGANIZATIONS SERVING THE CONTRACTOR'S RECRUITMENT AREA AND EMPLOYMENT NEEDS. NOT LATER THAN ONE MONTH PRIOR TO THE DATE FOR THE ACCEPTANCE OF APPLICATIONS FOR APPRENTICESHIP OR OTHER TRAINING BY ANY RECRUITMENT SOURCE, THE CONTRACTOR SHALL SEND WRITTEN NOTICE TO ORGANIZATIONS SUCH AS THE ABOVE, DESCRIBING THE OPENINGS, SCREENING PROCEDURES, AND TESTS TO BE USED IN THE SELECTION PROCESS.
- j. ENCOURAGE PRESENT MINORITY AND FEMALE EMPLOYEES TO RECRUIT OTHER MINORITY PERSONS AND WOMEN AND, WHERE REASONABLE, PROVIDE AFTER SCHOOL, SUMMER AND VACATION EMPLOYMENT TO MINORITY AND FEMALE YOUTH BOTH ON THE SITE AND IN OTHER AREAS OF THE CONTRACTOR'S WORK FORCE.
- k. VALIDATE ALL TESTS AND OTHER SELECTION REQUIREMENTS WHERE THERE IS AN OBLIGATION TO DO SO UNDER 41 C.F.R. PART 60-3.
- l. CONDUCT, AT LEAST ANNUALLY, AN INVENTORY AND EVALUATION AT LEAST OF ALL MINORITY AND FEMALE PERSONNEL FOR PROMOTIONAL OPPORTUNITIES AND ENCOURAGE THESE EMPLOYEES TO SEEK OR PREPARE FOR, THROUGH APPROPRIATE TRAINING, ETC., SUCH OPPORTUNITIES.
- m. ENSURE THAT SENIORITY PRACTICES, JOB CLASSIFICATIONS, WORK ASSIGNMENTS, AND OTHER PERSONNEL PRACTICES DO NOT HAVE A DISCRIMINATORY EFFECT BY CONTINUALLY MONITORING ALL PERSONNEL AND EMPLOYMENT RELATED ACTIVITIES TO ENSURE THAT THE EEO POLICY AND THE CONTRACTOR'S OBLIGATIONS UNDER THESE SPECIFICATIONS ARE BEING CARRIED OUT.
- n. ENSURE THAT ALL FACILITIES AND COMPANY ACTIVITIES ARE NONSEGREGATED EXCEPT THAT SEPARATE OR SINGLE-USER TOILET AND NECESSARY CHANGING FACILITIES SHALL BE PROVIDED TO ASSURE PRIVACY BETWEEN SEXES.
- o. DOCUMENT AND MAINTAIN A RECORD OF ALL SOLICITATIONS OF OFFERS FOR SUBCONTRACTS FROM MINORITY AND FEMALE CONSTRUCTION CONTRACTORS AND SUPPLIERS, INCLUDING CIRCULATION OF SOLICITATIONS TO MINORITY AND FEMALE CONTRACTOR ASSOCIATIONS AND OTHER BUSINESS ASSOCIATIONS.
- p. CONDUCT A REVIEW, AT LEAST ANNUALLY, OF ALL SUPERVISORS' ADHERENCE TO AND PERFORMANCE UNDER THE CONTRACTOR'S EEO POLICIES AND AFFIRMATIVE ACTION OBLIGATIONS.

8. CONTRACTORS ARE ENCOURAGED TO PARTICIPATE IN VOLUNTARY ASSOCIATIONS THAT ASSIST IN FULFILLING ONE OR MORE OF THEIR AFFIRMATIVE ACTION OBLIGATIONS SET FORTH IN PARAGRAPHS (7)(a) THROUGH (p). THE EFFORTS OF A CONTRACTOR ASSOCIATION, JOINT CONTRACTOR-UNION, CONTRACTOR-COMMUNITY, OR OTHER SIMILAR GROUP OF WHICH THE CONTRACTOR IS A MEMBER AND PARTICIPANT, MAY BE ASSERTED AS FULFILLING ANY ONE OR MORE OF ITS OBLIGATIONS UNDER PARAGRAPHS (7)(a) THROUGH (p) OF THESE SPECIFICATIONS, PROVIDED THAT THE CONTRACTOR ACTIVELY PARTICIPATES IN THE GROUP, MAKES EVERY EFFORT TO ASSURE THAT THE GROUP HAS A POSITIVE IMPACT ON THE EMPLOYMENT OF MINORITIES AND WOMEN IN THE INDUSTRY, ENSURES THAT THE CONCRETE BENEFITS OF THE PROGRAM ARE REFLECTED IN THE CONTRACTOR'S MINORITY AND FEMALE WORK FORCE PARTICIPATION, MAKES A GOOD FAITH EFFORT TO MEET ITS INDIVIDUAL GOALS AND TIMETABLES, AND CAN PROVIDE ACCESS TO DOCUMENTATION THAT DEMONSTRATES THE EFFECTIVENESS OF ACTIONS TAKEN ON BEHALF OF THE CONTRACTOR. THE OBLIGATION TO COMPLY, HOWEVER, IS THE CONTRACTOR'S AND FAILURE OF SUCH A GROUP TO FULFILL AN OBLIGATION SHALL NOT BE A DEFENSE FOR THE CONTRACTOR'S NONCOMPLIANCE.
9. A SINGLE GOAL FOR MINORITIES AND A SEPARATE SINGLE GOAL FOR WOMEN HAVE BEEN ESTABLISHED. THE CONTRACTOR, HOWEVER, IS REQUIRED TO PROVIDE EQUAL EMPLOYMENT OPPORTUNITY AND TO TAKE AFFIRMATIVE ACTION FOR ALL MINORITY GROUPS, BOTH MALE AND FEMALE, AND ALL WOMEN, BOTH MINORITY AND NON-MINORITY. CONSEQUENTLY, THE CONTRACTOR MAY BE IN VIOLATION OF THE EXECUTIVE ORDER IF A PARTICULAR GROUP IS EMPLOYED IN A SUBSTANTIALLY DISPARATE MANNER (EVEN THOUGH THE CONTRACTOR HAS ACHIEVED ITS GOAL FOR WOMEN GENERALLY, THE CONTRACTOR MAY BE IN VIOLATION OF THE EXECUTIVE ORDER IF A SPECIFIC MINORITY GROUP OF WOMEN IS UNDERUTILIZED).
10. THE CONTRACTOR SHALL NOT USE THE GOALS AND TIMETABLES OR AFFIRMATIVE ACTION STANDARDS TO DISCRIMINATE AGAINST ANY PERSON BECAUSE OF RACE, COLOR, RELIGION, SEX, OR NATIONAL ORIGIN.
11. THE CONTRACTOR SHALL NOT ENTER INTO ANY SUBCONTRACT WITH ANY PERSON OR FIRM DEBARRED FROM GOVERNMENT CONTRACTS PURSUANT TO EXECUTIVE ORDER NO. 11246.
12. THE CONTRACTOR SHALL CARRY OUT SUCH SANCTIONS AND PENALTIES FOR VIOLATION OF THESE SPECIFICATIONS AND OF THE EQUAL OPPORTUNITY CLAUSE, INCLUDING SUSPENSION, TERMINATION AND CANCELLATION OF EXISTING SUBCONTRACTS AS MAY BE IMPOSED OR ORDERED PURSUANT TO EXECUTIVE ORDER NO. 11246, AS AMENDED, AND ITS IMPLEMENTING REGULATIONS, BY THE OFFICE OF FEDERAL CONTRACT COMPLIANCE PROGRAMS. ANY CONTRACTOR WHO FAILS TO CARRY OUT SUCH SANCTIONS AND PENALTIES SHALL BE IN VIOLATION OF THESE SPECIFICATIONS AND EXECUTIVE ORDER NO. 11246, AS AMENDED.
13. THE CONTRACTOR, IN FULFILLING ITS OBLIGATIONS UNDER THESE SPECIFICATIONS, SHALL IMPLEMENT SPECIFIC AFFIRMATIVE ACTION STEPS, AT LEAST AS EXTENSIVE AS THOSE STANDARDS PRESCRIBED IN PARAGRAPH (7) OF THESE SPECIFICATIONS, SO AS TO ACHIEVE MAXIMUM RESULTS FROM ITS EFFORTS TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY. IF THE CONTRACTOR FAILS TO COMPLY WITH THE REQUIREMENTS OF THE EXECUTIVE ORDER, THE IMPLEMENTING REGULATIONS, OR THESE SPECIFICATIONS, THE DIRECTOR SHALL PROCEED IN ACCORDANCE WITH 41 C.F.R. § 60-4.8.

14. THE CONTRACTOR SHALL DESIGNATE A RESPONSIBLE OFFICIAL TO MONITOR ALL EMPLOYMENT RELATED ACTIVITY TO ENSURE THAT THE COMPANY EEO POLICY IS BEING CARRIED OUT, TO SUBMIT REPORTS RELATING TO THE PROVISIONS HEREOF AS MAY BE REQUIRED BY THE GOVERNMENT AND TO KEEP RECORDS. RECORDS SHALL AT LEAST INCLUDE FOR EACH EMPLOYEE THE NAME, ADDRESS, TELEPHONE NUMBERS, CONSTRUCTION TRADE, UNION AFFILIATION IF ANY, EMPLOYEE IDENTIFICATION NUMBER WHEN ASSIGNED, SOCIAL SECURITY NUMBER, RACE, SEX, STATUS (E.G., MECHANIC, APPRENTICE TRAINEE, HELPER OR LABORER), DATES OF CHANGES IN STATUS, HOURS WORKED PER WEEK IN THE INDICATED TRADE, RATE OF PAY, AND LOCATIONS AT WHICH THE WORK WAS PERFORMED. RECORDS SHALL BE MAINTAINED IN AN EASILY UNDERSTANDABLE AND RETRIEVABLE FORM; HOWEVER, TO THE EXTENT THAT EXISTING RECORDS SATISFY THIS REQUIREMENT, CONTRACTORS SHALL NOT BE REQUIRED TO MAINTAIN SEPARATE RECORDS.
15. NOTHING HEREIN PROVIDED SHALL BE CONSTRUED AS A LIMITATION UPON THE APPLICATION OF OTHER LAWS THAT ESTABLISH DIFFERENT STANDARDS OF COMPLIANCE OR UPON THE APPLICATION OF REQUIREMENTS FOR THE HIRING OF LOCAL OR OTHER AREA RESIDENTS (E.G., THOSE UNDER THE PUBLIC WORKS EMPLOYMENT ACT OF 1977 AND THE COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM).

APPENDIX NO. 1

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER NO. 11246):

- (1) THE OFFEROR'S OR BIDDER'S ATTENTION IS CALLED TO THE "EQUAL OPPORTUNITY CLAUSE" AND THE "STANDARD FEDERAL EQUAL EMPLOYMENT SPECIFICATIONS" SET FORTH HEREIN.

- (2) (a) THE GOALS AND THE TIMETABLES FOR MINORITY AND FEMALE PARTICIPATION, EXPRESSED IN PERCENTAGE TERMS FOR THE CONTRACTOR'S AGGREGATE WORK FORCE IN EACH TRADE ON ALL CONSTRUCTION WORK IN THE COVERED AREA, ARE AS FOLLOWS:

TIMETABLES GOALS FOR MINORITY
PARTICIPATION IN EACH TRADE
(SEE APPENDIX NO. 2)

GOALS FOR FEMALES
PARTICIPATION IN EACH TRADE
6.9%

GOALS FOR EACH YEAR
(SEE APPENDIX NO. 2)

GOALS FOR EACH YEAR
6.9%

- (b) THESE GOALS ARE APPLICABLE TO ALL THE CONTRACTOR'S CONSTRUCTION WORK (WHETHER OR NOT IT IS FEDERAL OR FEDERALLY ASSISTED) PERFORMED IN THE COVERED AREA. IF THE CONTRACTOR PERFORMS CONSTRUCTION WORK IN A GEOGRAPHICAL AREA LOCATED OUTSIDE THE COVERED AREA, IT SHALL APPLY THE GOALS ESTABLISHED FOR SUCH GEOGRAPHICAL AREA WHERE THE WORK IS ACTUALLY PERFORMED. WITH REGARD TO THIS SECOND AREA, THE CONTRACTOR ALSO IS SUBJECT TO THE GOALS FOR BOTH ITS FEDERALLY INVOLVED AND NON FEDERALLY INVOLVED CONSTRUCTION.
- (c) THE CONTRACTOR'S COMPLIANCE WITH THE EXECUTIVE ORDER AND THE REGULATIONS AT 41 C.F.R. PART 60-4 SHALL BE BASED ON ITS IMPLEMENTATION OF THE EQUAL OPPORTUNITY CLAUSE, SPECIFIC AFFIRMATIVE ACTION OBLIGATIONS REQUIRED BY THE SPECIFICATIONS SET FORTH AT 41 C.F.R. 160-4.3(a), AND ITS EFFORTS TO MEET THE GOALS. THE HOURS OF MINORITY AND FEMALE EMPLOYMENT AND TRAINING MUST BE SUBSTANTIALLY UNIFORM THROUGHOUT THE LENGTH OF THE CONTRACT, AND IN EACH TRADE, AND THE CONTRACTOR SHALL MAKE A GOOD FAITH EFFORT TO EMPLOY MINORITIES AND WOMEN EVENLY ON EACH OF ITS PROJECTS. THE TRANSFER OF MINORITY OR FEMALE EMPLOYEE OR TRAINEES FROM CONTRACTOR TO CONTRACTOR OR FROM PROJECT TO PROJECT FOR THE SOLE PURPOSE OF MEETING THE CONTRACTOR'S GOALS SHALL BE A VIOLATION OF THE CONTRACT, THE EXECUTIVE ORDER, AND THE REGULATIONS IN AT 41 C.F.R. PART 60-4. COMPLIANCE WITH THE GOALS WILL BE MEASURED AGAINST THE TOTAL WORK HOURS PERFORMED.
- (3) THE CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO THE DIRECTOR OF THE OFFICE OF FEDERAL CONTRACT COMPLIANCE PROGRAMS WITHIN 10 WORKING DAYS OF AWARD OF ANY CONSTRUCTION SUBCONTRACT IN EXCESS OF \$10,000 AT ANY TIER FOR CONSTRUCTION WORK UNDER THE CONTRACT RESULTING FROM THIS SOLICITATION. THE NOTIFICATION SHALL LIST THE NAME, ADDRESS, AND TELEPHONE NUMBER OF THE SUBCONTRACTOR; ESTIMATED DOLLAR AMOUNT OF THE SUBCONTRACT; ESTIMATED STARTING AND COMPLETION DATES OF THE SUBCONTRACT; AND THE GEOGRAPHICAL AREA IN WHICH THE SUBCONTRACT IS TO BE PERFORMED.
- (4) AS USED IN THIS NOTICE, AND IN THE CONTRACT RESULTING FROM THIS SOLICITATION, THE "COVERED AREA" IS (SEE NOTICE TO BIDDERS).

APPENDIX NO. 2

THE COMMONWEALTH OF MASSACHUSETTS

SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY ANTI DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

- I. FOR PURPOSES OF THIS CONTRACT, "minority" refers to Asian-Americans, Blacks, Spanish Surnamed Americans, North American Indians, and Cape Verdeans. "Commission" refers to the Massachusetts Commission Against Discrimination.
- II. During the performance of this contract, the Contractor and all of (his) Subcontractors (hereinafter collectively referred to as the Contractor), for himself, his assignees, and successors in interest, agree as follows:
 1. In connection with the performance of work under this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising, recruitment layoff; termination; rates of pay or other forms of compensation, conditions or privileges of employment; and selection for apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Commission setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (M.G.L. Chapter 151B).
 2. In connection with the performance of work under this contract, the Contractor, shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, and in service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age, or sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.
- III.
 1. As part of his obligation of remedial action under the foregoing section, the Contractor shall maintain on this project a not less than 15.3 percent ratio of minority employee man hours to total man hours in each job category, including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work enumerated in Section 44F of Chapter 149 of the Massachusetts General Laws.
 2. In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals from a multi employer affirmative action program approved by the Commission, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee or the Commission.
- IV.
 1. At the discretion of the Commission there may be established for the life of this contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering this project, herein after

called the administering agency, the Commission and such other representatives as may be designated by the Commission in conjunction with the administering agency.

2. The Contractor (or his agent, if any, designated by him the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.
3. The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the Commencement of the period covered, and also when updated, to the Commission and Liaison Committee.
4. Records of employment referral orders, prepared by the Contractor, shall be made available to the Commission and to the Liaison Committee on request.
5. The Contractor shall prepare weekly reports in a form approved by the Commission of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these shall be provided at the end of each such week to the Commission and to the Liaison Committee.

V. If the Contractor shall use any subcontractor on any work performed under this contract, he shall take affirmative action to negotiate with qualified minority subcontractors. This affirmative action shall cover both pre-bid and postbid periods. It shall include notification to the Office of Minority business Assistance (within the Executive Office of Communities and Development) or its designee, when bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

VI. In the employment of journeymen, apprentices, trainees and advanced trainees, the Contractor shall give preference, first, to citizens of the Commonwealth who have served in the Armed Forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to perform the work to which the employment relates, and, secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

VII. A designee of the Commission and a designee of the Liaison Committee shall each have right of access to the construction site.

VIII. Compliance with Requirements

The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 116 dated May 1, 1975, and of Chapter 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this contract.

IX. Non-Discrimination

The Contractor, in the performance of all work after award, and prior to completion of the contract work, will not discriminate on grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of subcontractors, or in the procurement of materials and rentals of equipment.

X. Solicitations for Sub-Contracts, and for the Procurement of Materials and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative to non-discrimination and affirmative action.

XI. Bidders Certification Requirement

For Bidders Certification Requirements, please refer to the Form for Bid included in the Proposal Form for this Contract.

XII. Contractor's Certification

The Contractor's certification form must be signed by all successful low bidder(s) prior to award by the contracting agency.

XIII. Compliance - Information, Reports and Sanctions

1. The Contractor will provide all information and reports required by the administering agency or the Commission on instructions issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the Commission to affect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency or the Commission as appropriate and shall set forth what efforts he has made to obtain the information.
2. Whenever the administering agency, the Commission, or the Liaison Committee believes the General Contractor or any Subcontractor may not be operating in compliance with the terms of this Section, the Commission directly, or through its designated agent, shall conduct an appropriate investigation, and may confer with the parties, to determine if such contractor is operating in compliance with the terms of this Section. If the Commission or its agent finds the General Contractor or any subcontractor not in compliance, it shall make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgment of the Commission or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Commission shall make a final report of noncompliance, and recommend to the administering agency the imposition of one or more of the sanctions listed below. If, however, the Commission believes the General Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of noncompliance. Within fourteen days of the receipt of the recommendations of the Commission, the administering agency shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:
 - (a) The recovery by the administering agency from the General Contractor of 1/100 of 1% of the contract award price or \$1000 whichever sum is greater, in the nature of liquidated damages or, if a Subcontractor is in non-compliance, the recovery by the administering agency from the General Contractor, to be assessed by the General Contractor as a back charge against the Subcontractor, of 1/10 of 1% of the subcontract price, or \$400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;

- (b) The suspension of any payment or part thereof due under the contract until such time as the General Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract;
 - (c) The termination, or cancellation, of the contract, in whole or in part, unless the General Contractor or any Subcontractor is able to demonstrate within a specified time his compliance with the terms of the contract;
 - (d) The denial to the General Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering agency for a period of up to three years.
3. If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that he is in compliance with this Section, he may request the administering agency, in consultation with the Commission, to suspend the sanctions conditionally, pending a final determination by the Commission as to whether the Contractor is in compliance. Upon final determination of the Commission, the administering agency, based on the recommendation of the Commission, shall either lift the sanctions or reimpose them.
4. Sanctions enumerated under Sections XIII-2 shall not be imposed by the administering agency except after an adjudicatory proceeding, as that term is used M.G.L. c. 30A, has been conducted. No investigation by the Commission or its agent shall be initiated without prior notice to the Contractor.

XIV. Severability

The provisions of this section are severable, and if any of those provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

A. **Contractor's Certification**

A contractor will not be eligible for award of a contract unless such contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

Contractor

certifies that:

1. it intends to use the following listed construction trades in the work under the contract
_____ and
2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
3. will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions.

(Signature of authorized representative of contractor)

B. Subcontractors' Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting subcontract:

SUBCONTRACTORS' CERTIFICATION

Subcontractor

certifies that:

1. it intends to use the following listed construction trades in the work under the subcontract and
2. _____
will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
3. will obtain from each of the subcontractors prior to the award of any subcontract under this subcontract the subcontractor certification required by these bid conditions.

(Signature of authorized representative of subcontractor)

In order to ensure that the said subcontractors certification becomes a part of all subcontracts under the prime contract, no subcontract shall be executed until an authorized representative of the state agency (or agencies) administering this project has determined, in writing, that the said certification has been incorporated in such subcontract, regardless of tier. Any subcontract executed without such written approval shall be void.

APPENDIX NO. 3

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

DISADVANTAGE BUSINESS ENTERPRISE PARTICIPATION PROVISION

APPENDIX NO. 3

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Please submit with bid package, a separate unavailability certification form for each unavailable DBE.

I. DEFINITIONS

As used in this Disadvantaged Business Enterprise Participation Provision ("Provision"), the following terms shall have the following meanings:

A. Authority

The Massachusetts Bay Transportation Authority, or an officer, employee or agent thereof designated by the Authority for the particular purpose involved;

B. Bidder

Any individual, partnership, joint venture, corporation, or firm submitting a general bid, directly or through an authorized representative, for the Contract;

C. Compliance Monitor

The individual or individuals designated from time to time by the Authority to assist and make recommendations to the Authority with respect to compliance with this Provision;

D. Contract

The contract, executed by the Authority and the Successful Bidder, of which this Provision is a part,

E. Contract Price

The total bid price of the Successful Bidder upon which the Contract is awarded;

F. An Original Affidavit

An original affidavit, in the form annexed to this Provision; to be signed by a Principal of a Disadvantaged Business Enterprise.

G. Original Letter of Intent

An original letter, in the form annexed to this Provision, to be signed by a Principal of a Disadvantaged Business Enterprise with respect to certain work under the Contract;

H. Disadvantaged Business Enterprise

A "Disadvantaged Business" or "DBE" means a small business concern as defined pursuant to Section 8(a) of the Small Business Act (15 U.S.C. s.637 (a)) and Implementing Regulations, which is owned and controlled by one or more socially and economically disadvantaged individuals, or is a Women-Owned Business Enterprise as defined in Paragraph K. of this Appendix 3. For purposes of this Provision, owned and controlled means a business:

1. which is at least 51 percent owned by one or more socially and economically disadvantaged individuals, or in the case of a publicly-owned business, at least 51 percent of the stocks of which is owned by one or more socially and economically disadvantaged individuals; and

2. whose management and daily business operations are controlled by one or more of such individuals.

I. SMALL BUSINESS CONCERN

Means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

J. SOCIALLY AND ECONOMICALLY DISADVANTAGED INDIVIDUALS

Means those individuals who are citizens of the United States (or lawfully admitted permanent residents)

and who are Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans or Asian-Indian Americans and any other minorities or individuals found to be disadvantaged by the Small Business Administration pursuant to Section 8(a) of the Small Business Act (15 U.S.C. s.637(a)) :

1. **"Black Americans"**, which include persons having origins in any of the Black racial groups of Africa;
2. **"Hispanic Americans,"** which include persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
3. **"Native Americans,"** which include persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;
4. **"Asian-Pacific Americans,"** which include persons whose origins are Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U.S. Trust Territories of the Pacific, and the Northern Marianas; and
5. **"Asian Indian American,"** which include persons whose origins are from India, Pakistan, and Bangladesh.
6. Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or culture bias within American society because of their identities as members of groups and without regard to their individual qualities. Personal experiences of substantial and chronic social disadvantage in American society, not in other countries and negative impact on entry into or advancement in the business world because of the disadvantage as defined pursuant to 49CFR Appendix E, Part 26.

The Personal Net Worth of the principal owner of an Economic Disadvantaged Business may not exceed a threshold of \$750,000. In determining net worth, an individual, ownership interest in the disadvantaged firm and the individuals equity in his or her primary place of residence must be excluded from the calculation.

7. Economic disadvantage, economically disadvantaged individuals are socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to the diminished capital and credit opportunities as compared to others in the same or similar line of business who are not socially disadvantaged.

K. A **"Women-Owned Business"** to qualify as a "DBE" means a small business concern as defined pursuant to Section 3 of the Small Business Act and Implementing Regulations, which is owned and controlled by one or more women. For purposes of this provision, owned and controlled means a business:

1. which is at least 51 percent owned by one or more women, or in the case of a publicly-owned business, at least 51 percent of the stocks of which are owned by one or more such individuals; and
2. whose management and daily business operations are controlled by one or more women.

L. Certification Letter

For the purposes of the DBE Provision, this term means the following:

1. A letter from SOMWBA certifying the DBE; or
2. A certification from a local government, state government or federal government entity which is authorized to certify DBE status and which uses the criteria for certification that is equivalent to that used by SOMWBA; or
3. A certification from an agency whose DBE certification process has been approved by FTA; or
4. A certification under Section 8(a) of the Small Business Act (15 U.S.C. s.637(a)).

M. Business Enterprise List

The Authority currently utilizes the business registry entitled, **The State Office of Minority and Women Business Assistance Directory** which is issued by the State Office of Minority and Women Business Assistance (SOMWBA). For the purpose of this provision the term "Business Enterprise List" or "List" shall mean the SOMWBA directory. The companies listed herein as Minority Business Enterprises are identical to those defined by this Provision as Disadvantaged Business Enterprises.

The inclusion of a firm in this Directory is for informational purposes only and does not constitute endorsement of a Contractor, Manufacturer, or Supplier. The Business Enterprise List is available to be viewed at the Authority's Equal Employment Opportunity/Affirmative Action Office.

N. Business Enterprise Unavailability Certification

A written certification, in the form annexed to this Provision, by a Disadvantaged Business Enterprise as to its unavailability for certain work. A SEPARATE UNAVAILABILITY CERTIFICATION FORM IS TO BE FILED FOR EACH UNAVAILABLE DBE.

O. Notice of Opportunity to Meet with Authority

Upon request, a Bidder may be given an opportunity to meet with the Authority with respect to the Authority's determination of the Bidder's compliance with this Provision.

P. Qualified

A DBE contractor is qualified to do specific work if it meets all of the following criteria:

1. it has or is able to obtain any and all licenses required to do such work;
2. it has the necessary experience, organization, technical qualifications, skills and facilities to do such work;
3. it is able to comply with the performance schedule reasonably needed for such work;
4. it does not have an unsatisfactory record of integrity, judgement and performance;
5. it is able to meet the applicable Equal Employment Opportunity requirements; and
6. it is not otherwise ineligible to perform such work under applicable laws and regulations.

Q. Schedule for Participation by Business Enterprise

A schedule, in the form annexed to this Provision, containing certain information with respect to work to be performed by Disadvantaged Business Enterprises.

R. Successful Bidder

The bidder to which the Contract is awarded. Among responsible and responsive Bidders, the one offering the lowest reasonable price, as determined by the Authority, and meeting the DBE requirements of this Provision, shall be awarded the contract. Additionally the ability to meet other contractual obligations, deemed to be appropriate, will be considered before awarding the contract.

S. Unavailable

A Business Enterprise is unavailable to do specific work if:

1. it does not have the knowledge of the terms and specifications of the Contract needed to formulate a proposal to do such work or to decline an opportunity to formulate such a proposal; and
2. it does not intend, or is unable, to make a proposal because of lack of interest, inability to meet the reasonable and ordinary demands connected with doing such work, unwillingness to meet the specifications of such work, unwillingness to work on this project or in this geographic area, or such other reason as is determined by the Authority to be sufficient;
4. a separate DBE unavailability certification form should be utilized for each unavailable DBE. An unavailability certification form is annexed to this provision.

T. Good Faith Efforts

To demonstrate sufficient reasonable efforts to meet the DBE contract goal, a contractor shall document the steps it has taken to obtain DBE participation, including but not limited to the following;

1. Attendance at a prebid meeting, if any, scheduled by the recipient to inform the Contractor of DBE subcontracting opportunities under a given solicitation.
2. Advertisement in general circulation media, trade association publication, and minority-focus media for at least 20 days before bid or proposals are due. If 20 days are not available, publication for a shorter reasonable time is acceptable.
3. Written notification to DBEs that their interest in the contract is solicited;
4. Efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goal.
5. Efforts to negotiate with DBEs for specific subbids including at a minimum.
 - a. the names, addresses, and telephone numbers of DBEs that were contacted;
 - b. a description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed; and
 - c. a statement of why additional agreements with DBEs were not reached;
6. Effort made to assist the DBE contacted in obtaining bonding or insurance required by the contractor or recipient.
7. Concerning each DBE, the contractor contacted but rejected as unqualified, as well as the reasons for the contractor's conclusion;
8. Prime Contractor must document that he/she made adequate good faith efforts to meet the goal, even though he/she did not succeed in obtaining enough DBE participation to do so.
 - a. The dollar amount of the participation of each DBE firm contacted by Prime Contractor;
 - b. Contractor must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
 - c. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved.
 - d. Where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own workforce.
 - e. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist

them in responding to a solicitation. The above list of types of actions is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Pursuant to 49CFR appendix A to Part 26 - Guidance Concerning Good Faith Efforts.

II. UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES

A. Affirmative Action Obligation

Each Bidder shall take affirmative action, and shall comply with the requirements of the Provision, to achieve the stated goal for the utilization of Disadvantaged Business Enterprises in their performance of work under this Contract. Nothing in this Provision shall be construed to require the utilization of any Disadvantaged Business Enterprise which is either not Qualified or Unavailable. All determinations of compliance or non-compliance with the requirements of this Provision, and of the appropriate consequences of non-compliance, shall be made by the Authority as provided herein. All such determinations shall be final and binding within the Authority and not subject to further administrative review within the Authority. Nothing in this Provision shall be construed to diminish the responsibility of the Authority pursuant to federal and state laws.

B. Stated Goal

The stated goal is to have portions of the work under the Contract performed by Qualified Disadvantaged Business Enterprises for prices totaling not less than 10 percent of the Contract Price. A contractor may count toward its DBE goal 60 percent of the total bid price for its expenditures of its materials and supplies required under a contract and obtained from a DBE regular dealer, and 100 percent of the total bid price of such expenditures to a DBE manufacturer.

C. Joint Venture

A contractor may count toward its DBE goals a portion of the total dollar value of a contract with a joint venture eligible under the standards of this Section III B (3) equal to the percentage of the ownership and controls of the DBE partner in the joint venture.

D. Business Enterprise Bidder

A bidder which itself is a Disadvantaged Business Enterprise, may subject to compliance with the applicable requirements of this Provision, achieve the stated goal by complying with the limitation on subcontracting provided under "Subletting or Assignment of Contract" in the Standard Specifications.

E. Contractor Assurances

The Prime Contractor or Subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract.

The Contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract.

The Contractor shall carry out applicable requirements of 49CFR, Part 26, in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Authority deems appropriate.

III. BIDDING REQUIREMENTS AND PROCEDURES PRIOR TO CONTRACT AWARD

A. Pre-Bid Conference

At the prebid conference which shall be held with respect to the Contract, the Authority shall be available to review with prospective Bidders the steps they must take to comply with this Provision and to assist prospective Bidders with respect thereto. No action or failure to act of the Authority at the prebid conference shall in any way limit or otherwise affect the terms of this Provision or any portion thereof; however, Bidders shall be deemed to have notice of information made available with respect to this Provision at the prebid conference. The Authority will be available to the prospective Bidders for review of and assistance with the procedures for compliance with this Provision for Contracts that do not require a prebid conference.

B. Bid Submission

Each Bidder, as part of its bid submission, shall submit the following:

1. A completed Schedule for Participation by Disadvantaged Business Enterprises, listing those Qualified DBEs with which the Bidder intends to contract for the performance of portions of the work under the Contract, specifying the agreed price to be paid to each such Disadvantaged Business Enterprise for such work, identifying in detail the contract items or parts thereof to be performed by each such Disadvantaged Business Enterprise, including a proposed timetable for the performance of each such contract item and providing other information as may be required by the Schedule. No work shall be included in the Schedule which the Bidder has reason to believe the listed DBE will subcontract, at any tier, to other than a Disadvantaged Business Enterprise.
2. A completed and signed original Letter of Intent for each DBE listed in the Schedule;
3. For the purpose of this contract, the MBTA will accept only DBEs who are:

- a. Currently certified by the State Office of Minority and Women Business Assistance (SOMWBA);
4. For out-of-state firms, the bidder must also attach a copy of the criteria utilized by the certifying agency of the out-of-state firm. The certifying agency must have required at a minimum as a condition that:
 - a. Individuals who qualify as disadvantaged must own at least 51% of the business;
 - b. The business has been in existence for at least six months; and
 - c. The majority owners of the DBE control the day to day management and policy decisions of the firm.
5. In the event the work listed on the Schedule is not sufficient to fulfill the stated goal, a statement by the bidder of the reasons why it believes it is in compliance with this Provision is required. In addition, a list of the names, addresses and telephone numbers of the DBEs contacted by the bidder with respect to the performance of work under the Contract shall be submitted. The listing of a DBE by a Bidder on its Schedule shall constitute a representation by the Bidder that if it is awarded the Contract it will enter into a subcontract with such DBE for the portion of the work and at the price set forth in its bid submission, subject to the terms of this Provision and the Contract. If at the time of bid opening, the MBTA determines that the low bidder has failed to include in its bid package the most recent certification letter or original affidavit for any DBE listed on its DBE Schedule of participation, the bidder will have five days from the date of notification of this failure to present the missing certification letter or original affidavit to the MBTA.

C. Responsiveness of Bid

The total price for work to be performed by a DBE indicated in each Bidder's Bid Schedule for Participation must be sufficient to fulfill the stated goal unless the Bidder shall demonstrate to the satisfaction of the Authority that:

1. It has made every reasonable effort to contact and negotiate with DBEs in an attempt to subcontract work, including every reasonable effort to select the portions of the work proposed to be subcontracted, in order to achieve the stated goal;
2. It was unable, notwithstanding such efforts, to achieve the stated goal because DBEs were not Qualified or were Unavailable; and
3. It included in its Schedule such proposed agreements as could be made with such efforts.

The Authority may reject as non-responsive any bid which it determines fails to comply with the applicable requirements of this Provision unless the Authority allows the bid to be amended pursuant to Section III E. Nothing herein shall relieve any Bidder or any contractor performing any work under the Contract from any of the terms, conditions or requirements of the Contract or modify the Authority's rights reserved under "Consideration of Proposals" in the Standard Specifications.

D. Determination of Responsiveness of Bids

1. Investigation and Recommendation by Compliance Monitor

If the apparent low responsive (without regard to the requirements of this provision) and responsible bidder submits a bid which does not meet the DBE stated goal, the bidder will be notified by the Compliance Monitor within 3 days after the bid opening to meet with the compliance monitor at the offices of the Authority or such other place as the compliance monitor may designate. The purpose of this meeting shall be for the Compliance Monitor to consider whether to recommend that the Bidder's bid be determined to be in compliance with the requirements of this Provision or to be non-responsive. At this meeting the Bidder shall have an opportunity to present information and arguments pertinent to its compliance with the applicable requirement. At this meeting, the Bidder shall produce in writing the following information:

- a. a detailed statement of the efforts made to contact and negotiate with DBEs, including (I) the names, addresses and telephone numbers of DBEs who were contacted; (ii) a description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed; and (iii) a detailed statement of the reasons why additional prospective agreements with DBEs, if needed to meet the stated goal, were not reached;
- b. a detailed statement of the efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goal;
- c. as to each DBE contacted, but which the Bidder considers to be not Qualified, a detailed statement of the reasons for the Bidder's conclusion and
- d. as to each DBE contacted, but which the Bidder considers to be Unavailable, either (I) a DBE Unavailability Certification signed by the DBE, or (ii) a statement from the Bidder that the DBE refused to give such written certification after reasonable request, and a detailed statement from the Bidder of the reasons for the Bidder's conclusion that the DBE was Unavailable.

The Compliance Monitor may require the Bidder to produce such additional information as the Compliance Monitor deems appropriate and may obtain whatever other and further information, from whatever other sources, deemed appropriate. Not later than five (5) days after the initial meeting with the Bidder, the Compliance Monitor shall make a written recommendation to the Authority, which shall include a statement of the facts and reasons upon which it is based.

2. Determination by Authority

Following receipt of the Compliance Monitor's recommendation, the Authority shall send to the Bidder a Notice of Opportunity to meet with the Authority, enclosing a copy of the Compliance Monitor's recommendation. Such Notice shall indicate the date, time and place at which the Bidder may, if it so requests in writing, meet with the Authority and have an opportunity to present pertinent arguments and information relating to the determination by the Authority of the Bidder's compliance with this Provision. The Authority may request such further information from the Bidder as it deems appropriate, and may rely upon any factual conclusion reported by the Compliance

Monitor which is not contradicted by the Bidder. The Authority may also conduct informal conferences, to which the Bidder shall be invited, in which other parties invited by the Authority may offer information relevant to the issues on which its determination will be based. As soon as practicable, the Authority shall make a determination in writing and setting forth the facts and reasons upon which it is based, whether the bid of such Bidder complies with the requirements of this Provision or is non-responsive. A copy of such determination shall be sent to the Bidder. Such determination shall not affect the power of the Authority to reject the Bidder's bid for any other reasons.

3. **Consideration of Other Bids**

If the Authority deems it advisable in the interests of expediting the award of the Contract, the procedures set forth in this Section III(D) may be carried out with respect to the bids of one or more additional Bidders at the same time as, or subsequent to, that of the apparent low responsive and responsible Bidder, with each such procedure separately conducted. The Authority shall make its determination in the order of price rank in accordance with Section I (R).

4. **Failure of Bidder to Participate**

Failure of any Bidder to participate in any proceeding applicable with respect to its bid, after written request by the Compliance Monitor or the Authority, may result in a determination that its bid is non-responsive.

E. Amendment of Schedule for Participation by Disadvantaged Business Enterprise

A Bidder may amend its Schedule for Participation by DBEs only when directed to do so by the Authority. A Contractor must demonstrate good faith in its attempts to subcontract work, including having made every reasonable effort to select the portions of the work proposed to be subcontracted, in order to achieve the stated goal.

IV. REQUIREMENTS AND PROCEDURES SUBSEQUENT TO CONTRACT AWARD

A. Proposal, Execution and Compliance with Subcontractors

The Successful Bidder shall, in the manner prescribed in Art. 6.01A of the Standard Specifications, propose for the Authority's approval, subcontracts corresponding in all respects to the proposed agreements listed on the Successful Bidder's Schedule for Participation by Disadvantaged Business Enterprises included in its bid submission, or on its amended Schedule, if it has been directed to amend its Schedule.

Upon approval by the Authority, the Successful Bidder shall enter into each such approved subcontract and shall thereafter neither terminate any such subcontract nor reduce the scope of the work to be performed by, or decrease the price to be paid to, the DBE thereunder without in each instance the prior written approval of the Authority. The Authority retains the right to approve or disapprove any subcontract with a DBE proposed under this Provision for the same reasons and in the same manner that the Authority may approve or disapprove any other subcontract proposed to it.

If the Authority disapproves a subcontract required to be proposed under this Provision for reasons related to its Form, the Successful Bidder shall propose for approval another subcontract with the same DBE for the same work and at the same price, in a form acceptable to the Authority. If the Authority disapproves a subcontract required to be proposed under this Provision for any other reason, the Successful Bidder shall be excused from proposing that subcontract and shall be subject to the provisions of Section IV (B) (4).

B. Substitution of Subcontractor

1. Excuse from Entering Subcontractor

If, prior to execution of a subcontract required by this Provision, the Successful Bidder submits a written request to the Authority and demonstrates to the satisfaction of the Authority that; (a) as a result of a change in circumstances beyond its control of which it was not aware and could not reasonably have been aware until subsequent to the date of award of the Contract, (b) a DBE which is to enter into such subcontract has become not Qualified, or (c) that the DBE has unreasonably refused to execute the subcontract; the Successful Bidder shall be excused from executing such subcontract.

2. Rightful Termination of Subcontracts

If, after execution of a subcontract required by this Provision, the Successful Bidder submits a written request to the Authority that; (a) as a result of a change in circumstances beyond its control of which it was not aware and could not reasonably have been aware until subsequent to the date of execution of such subcontract; (b) a DBE which entered into such subcontract is found to be unqualified or has committed and failed to remedy a material breach of the subcontract, the Successful Bidder shall be entitled to exercise such rights as may be available to it to terminate the subcontract.

3. Determination of Excuse or Rightful Termination

If the Successful Bidder at any time submits a written request to the Authority under the provisions of either Section IV (B) (1) or Section IV (B) (2), the Authority, as soon as practicable, shall determine whether the Successful Bidder has made the requisite demonstration, and shall not determine that such determination has not been made without first providing the Successful Bidder, upon notice, an opportunity to present pertinent information and arguments.

4. Alternative Subcontracts

If the Successful Bidder is excused from proposing a subcontract under Section IV(A) or from executing a subcontract under Section IV (B) (1), or rightfully terminates a subcontract under Section IV(B) (2), and without such subcontract the Successful Bidder will not achieve the stated goal, the Successful Bidder shall within 15 days of written notification from the Authority make every reasonable effort to propose and enter into an alternative subcontract or subcontracts for the same work to be performed by another Qualified Disadvantaged Business Enterprise(s) for a contract price or prices totaling not less than the contract price under the excused or terminated subcontract, less all amounts previously paid thereunder. The Successful Bidder shall be deemed to satisfy the requirements of this Section IV (B) (4) if, within 15 days:

- a. it shall propose and enter each such alternative subcontract for the same work; or
- b. it demonstrates to the satisfaction of the Authority that it has made every reasonable effort to contact and negotiate with DBEs in an attempt to subcontract the work because DBEs were (i) not Qualified; (ii) Unavailable; or (iii) although Qualified and not Unavailable, unwilling or unable to propose a price for such work equal to or less than the greater of the price originally scheduled for such work (less all amounts previously paid therefor), or the price stated in another bona fide proposal, of which such DBEs had knowledge, submitted by another DBE(s) to which the Successful Bidder proposes to subcontract such work; or
- c. it shall propose and enter into subcontracts with another Qualified DBE(s), for prices totaling the price originally scheduled for such work (less all amounts not previously paid therefore) for the performance of other work not included in its Schedule or amended Schedule.

In any situation covered by this Section IV (B) (4), the Compliance Monitor shall promptly meet with the Successful Bidder and provide it an opportunity to demonstrate compliance with these requirements. The Compliance Monitor shall, as promptly as practicable, recommend to the Authority whether the Successful Bidder should be determined to be in compliance with these requirements. The Compliance Monitor may require the Successful Bidder to produce such information as the Compliance Monitor deems appropriate and may obtain whatever other and further information from whatever sources the Compliance Monitor deems appropriate. A copy of the Compliance Monitor's recommendation shall be sent promptly to the Successful Bidder. The Compliance Monitor shall not make his recommendation under this paragraph without giving the Successful Bidder notice and an opportunity to present pertinent information and arguments.

C. Continued Compliance

1. The Authority shall monitor the Compliance of the Successful Bidder with the requirements of this Provision during the course of the work to be performed under the Contract. The Successful Bidder shall permit the Authority to have access to the job site and to necessary records and to examine such information as the Authority deems appropriate for the purpose of investigating and determining compliance with this Provision, including, but not limited to, manning tables, records of expenditures, change orders, observations at the job site and contracts between the Successful Bidder and other parties entered into during the life of the Contract. THE SUCCESSFUL BIDDER MUST CERTIFY, ON FORMS PROVIDED BY THE AUTHORITY, THE DOLLAR VALUE OF WORK ACCOMPLISHED BY EACH SUBCONTRACTOR. THIS CERTIFICATION MUST ACCOMPANY EACH PAY ESTIMATE.

FAILURE TO SUBMIT INFORMATION REQUESTED BY THE AUTHORITY WITHIN SEVEN (7) DAYS MAY RESULT IN SANCTIONS LISTED UNDER SECTION IV (D) OF THIS PROVISION.

2. The Contractor shall permit the authorized representatives of the Massachusetts Bay Transportation Authority, U.S. Department of Transportation and the Comptroller General of the United States to inspect and audit all data and records of the Contractor

relating to its performance under the Disadvantaged Business Enterprise Participation Provision of this Contract through the expiration of three years after completion of the Contract with which Federal funds are used.

D. Sanctions for Violations

If at any time the Authority has reason to believe that the Successful Bidder is in violation of its obligations under this Provision, or has otherwise failed to comply with this Provision, the Authority may, in addition to pursuing any other available legal remedy, commence proceedings to impose such sanctions. Such sanctions may include, but are not limited to, one or more of the following:

1. the suspension of any payment or part thereof due the Successful Bidder until such time as the issues concerning the Successful Bidder's compliance are resolved;
2. the termination or cancellation of the Contract in whole or in part unless the Successful Bidder is able to demonstrate within a reasonable time its compliance with the terms of this Provision; and
3. the denial to the Successful Bidder of the right to participate in any further Contracts awarded by the Authority for a period of not longer than three (3) years.

No such sanction shall be imposed by the Authority upon the Successful Bidder without an adjudicatory proceeding conducted by the Authority.

E. PROMPT PAYMENT

In accordance with the Department of Transportation's Disadvantage Business Enterprise Regulations 40CFR, Part 26; all prime contractors are required to pay subcontractors for satisfactory performance of their contracts no later than 10 business days from receipt of each payment the MBTA makes to the prime contractor.

The prime contractor shall also promptly return any retainage payments to the subcontractor within 10 business days after the subcontractors work is satisfactorily completed.

All prime contractors are required to include in their subcontracts language assuring that the prime contractor and subcontractors will use appropriate dispute resolution mechanisms to resolve payment disputes.

If the prime contractor determines the work of the subcontractor to be unsatisfactory, it must notify the MBTA's Construction Project Manager, Contract Administration Department, and DBE Coordinator/ Contract Compliance Office, where applicable. Any delay or postponement of payment among the parties may take place only for good cause and with prior written approval from the MBTA.

The Authority reserves the right to not make payment to the prime contractor for work performed by subcontractors, DBEs and non-DBEs, unless and until the prime contractor ensures that the subcontractors are promptly paid for the work they have performed.

The prime contractor may be required to provide certified proof of payment to all subcontractors before any subsequent payments to prime contractors are made by the Authority.

Failure by the prime Contractor to comply with this requirement will be construed to be a breach of contract and subject to termination or sanctions specified in the contract.

Form A

SCHEDULE OF PARTICIPATION OF DISADVANTAGED BUSINESS ENTERPRISES
(TO BE ATTACHED TO THE BID FORM)

PROJECT No. **R20CN01**
Work Platform
LOCATION: 325 Grove Street

(NAME OF PRIME BIDDER)

NAME OF DISADVANTAGED BUSINESS	ADDRESS	TYPE OF WORK AND CONTRACT ITEMS OR PARTS THEREOF TO BE PERFORMED	PROJECT START / FINISH DATE FOR WORK

A COPY OF THE DBE'S MOST RECENT CERTIFICATION AND AN ORIGINAL AFFIDAVIT MUST BE ATTACHED TO THIS SCHEDULE.

R20CN01
2015

SUPPLEMENTARY CONDITIONS
00800 - 59

Work Platform

PROJECT No. **R20CN01**

Work Platforms for Riverside Carhouse

LOCATION: 325 Grove Street, Newton, MA

Form B

**DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION
LETTER OF INTENT**

To: _____
(Name of Prime Bidder)

The undersigned intends to perform work in connection with the above project as (check one):

_____ an individual _____ DBE
_____ a partnership _____ a joint venture
_____ a corporation

The Disadvantaged Business status of the undersigned is confirmed

- a. on the reference list of Disadvantaged Business Enterprises dated _____, or
b. on the attached Disadvantaged Business Enterprise identification Statement.

The undersigned is prepared to perform the following work in connection with the above project,
(Specify in detail particular work items or parts thereof to be performed):

at the following price: _____

You have projected the following commencement date for such work, and the undersigned is projecting completion of such work as follows:

<u>Items</u>	<u>Projected Commencement Date</u>	<u>Projected Completion Date</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

The above work will not be sublet to a non-Disadvantaged Business Enterprise at any tier. The undersigned will enter into a formal agreement for the above work with you, conditioned upon your execution of a contract with the MBTA.

Date _____

Name of Disadvantaged Business Enterprise

By _____

PROJECT No. **R20CN01**

Work Platforms for Riverside Carhouse

LOCATION: 325 Grove Street, Newton, MA

Form C

DBE AFFIDAVIT

STATE OF _____ (Date _____)

COUNTY OF _____ S.S.

The undersigned being duly sworn, deposes and says that he/she is the

(sole owner; partner; president; treasurer; or other duly authorized official of a corporation)

of _____
(Name of DBE)

and certifies that since the date of its certification by

(SOMWBA or out-of-state certification agency)

the certification has not been revoked nor has it expired nor has there been any change in the minority status of
(Name of DBE) _____

(Signature and Title of
Person Making Affidavit)

Sworn to before me this _____ day of _____ 20

(Notary Public)

NOTE: The Bidder must attach the DBEs most recent certification letter or document to this affidavit.

PROJECT No. **R20CN01**

Work Platforms for Riverside Carhouse

LOCATION: 325 Grove Street, Newton, MA

Form D

DISADVANTAGED BUSINESS ENTERPRISE UNAVAILABLE CERTIFICATION

I, _____, _____
(Name) (Title)

of _____, certify that on _____
(Prime Bidder) (Date)

I contacted the following Disadvantaged Business Enterprise to obtain a bid for work items to be performed on MBTA Contract No. R20CN01:

<u>Disadvantaged Contractor</u>	<u>Work Items Sought</u>	<u>Form of Bid Sought (i.e., unit price, materials & labor, labor only, etc.)</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

To the best of my knowledge and belief, said Disadvantaged Business Enterprise was unavailable for work on this project, or unable to prepare a bid for the following reason(s):

Signature: _____

Date: _____

_____, was offered an opportunity to bid on the
(Name of Business Enterprise)

above-identified work on _____ by _____
(Date) (Source)

The above statement is a true and accurate account of why I did not submit a bid on this project.

(Signature of Disadvantaged Business Enterprise)

(Title)

(Date)

A SEPARATE UNAVAILABILITY CERTIFICATION FORM SHOULD BE COMPLETED FOR EACH DBE

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division
Rev. Dec. 2008OMB No.: 1215-0149
Expires: 12/31/2011

NAME OF CONTRACTOR <input type="checkbox"/> OR SUBCONTRACTOR <input type="checkbox"/>		ADDRESS	OMB No.: 1215-0149 Expires: 12/31/2011
PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION	PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING DEDUCTIONS	(3) WORK CLASSIFICATION	OT OR ST	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS					(9) NET WAGES PAID FOR WEEK	
				HOURS WORKED EACH DAY										FICA	WITH- HOLDING TAX			OTHER		TOTAL DEDUCTIONS
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(i) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210

(over)

Date _____

I, _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)_____ ; that during the payroll period commencing on the
(Building or Work)_____ day of _____, and ending the _____ day of _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have
been or will be made either directly or indirectly to or on behalf of said_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly
from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part
3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,
63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are
correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the
applicable wage rates contained in any wage determination incorporated into the contract; that the
classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide
apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of
Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a
State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- ☐ - In addition to the basic hourly wage rates paid to each laborer or mechanic listed in
the above referenced payroll, payments of fringe benefits as listed in the contract
have been or will be made to appropriate programs for the benefit of such
employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- ☐ - Each laborer or mechanic listed in the above referenced payroll has been paid,
as indicated on the payroll, an amount not less than the sum of the applicable
basic hourly wage rate plus the amount of the required fringe benefits as listed
in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE

SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR
SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE
21 OF THE UNITED STATES CODE.

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SECTION 01010

SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 GENERAL

- A. The Work shall be performed in accordance with the following documents as issued by the Massachusetts Bay Transportation Authority:
1. The Standard Specification which includes the Instructions to Bidders, General Conditions; and Divisions 1 through 16.
 2. The Contract Specifications which includes the Notice to Bidders; Instructions to Bidders; Form for Bid; Various forms and exhibits; Supplementary Conditions; Federal and State requirements; and applicable Sections of Divisions 1 through 16.
 3. The Contract Drawings.

1.2 CONTRACT DESCRIPTION, COMMENCEMENT AND COMPLETION TIMES

- A. The Supplementary Conditions of the Contract Specifications will contain a description of the Work under the Contract, times for commencement and completion.

1.3 SUMMARY OF WORK

- A. The scope of Work at the Riverside Carhouse at 325 Grove Street in Newton, MA includes:
1. Removal of hazardous materials.
 2. Removal of an existing wood work platform, including electrical appurtenances.
 3. Furnish, install and commission two Type A2, one Type B1, and one Type B2 pre-manufactured work platforms.
 4. Furnish and install structural supports for work platforms.
 5. Furnish and install fire protection, electrical and compressed air service to and lighting for new work platforms.
 6. Furnish and install safety signs and padding to existing structure at new Type B1 work platform.
 7. Furnish and install fire protection in basement corridor. Remove and replace existing ceiling and lighting in basement corridor.
 8. Furnish and install new mechanical ventilation for the HPCU (Hydraulic Pressure Control Unit) Room, including select demolition of existing mechanical system, new rooftop unit and associated roof work, duct work, mobile fume extraction unit, and cutting and patching.
 9. Renovate select existing toilet rooms for accessibility, including fire protection, plumbing, mechanical and electrical work.
 10. Modify sectionalizing switching for the existing catenary to provide additional "red lights" at higher level on the walls above, for improved visibility.

11. Accessible parking.
 12. Allowances, as indicated.
- B. Limitations to the Work are indicated, including requirements related to phasing, scheduling, sequencing the Work, construction limitations, and permitting continuous occupancy and operations by the Authority throughout the construction period.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of work to which they pertain.

END OF SECTION

SECTION 01020

ALLOWANCES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies allowances for all services, personnel, labor, materials, and equipment necessary to perform the work as specified herein. The Contractor shall include in his bid proposal the allowance for each item listed. Except for when the Contractor performs the work, he shall not add any Contractor markups, including overhead and profit, except as noted, to these allowance items. The work is further specified in Section 01010 - SUMMARY OF WORK and in the applicable Construction Specifications sections referenced herein.

1.2 ALLOWANCE ITEMS

- A.** Section 00700 – GENERAL CONDITIONS, Paragraph 2.3 – Extra Work. Include an allowance amount of \$100,000 for Risk Allowance Reallocation - Item No. 6500.000.
- B.** Section 01565 – RODENT CONTROL. Include an allowance amount of \$2,500 for Rodent Control - Item No. 0213.202.
- C.** Section 01570 – TRAFFIC REGULATION. Include an allowance amount of \$6,000 for Traffic Officers Services - Item No. 0130.429.
- D.** Section 15400 – PLUMBING SYSTEMS. Include an allowance amount of \$3,000 for Plumbing System - Item No. 1501.010.

1.3 MEASUREMENT

- A.** Allowances will be made to reimburse the Contractor for work and materials performed and supplied by the Contractor and others as specified herein and as further specified in the applicable Construction Specifications Sections.

1.4 PAYMENT

- A.** Before permitting work to begin under any allowance, the Contractor shall request an itemized written estimate of cost from the Railroad, utility companies, private firms, subcontractors, and City and State agencies for the work to be performed. The Contractor shall submit these written estimates to the Engineer for review and approval. For work performed by the Contractor, he shall be reimbursed in accordance with Section 01151 - MEASUREMENT AND PAYMENT, Part 1 "Payment for Extra Work" Article. No payments exceeding the approved amounts will be made by the Authority.

- B. Payment for allowances will be based upon receipted invoices and signed receipts, without charges for Contractor overhead and profit (except when the Contractor performs the work), submitted for the actual work performed.
- C. The Contractor shall submit receipted copies of itemized invoices for such work to the Authority for partial payments. Payment will be based upon receipted invoices and signed receipts from the utility companies, private firms, Railroad, subcontractors or the City and/or State agencies to the Contractor, four copies of which shall be submitted to the Authority.
- D. The final payment for allowances under this Contract will be withheld until the Contractor has paid each affected utility company, private firm, Railroad, subcontractor, or City and/or State agency for all costs in connection with work specified herein.
- E. Each allowance will be adjusted to the actual amount paid by the Contractor for such work done.

1.5 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0213.202	Rodent Control	AN
0130.429	Traffic Officers Services	AN
1501.010	Plumbing System	AN
6500.000	Risk Allowance	AN

END OF SECTION

SECTION 01070

ABBREVIATIONS AND DEFINITIONS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies abbreviations for standards and trade associations and definition of technical terms.

1.2 ABBREVIATIONS AND NAMES

- A. The following abbreviations as referenced in the Contract Documents are defined to mean:

1.	AA	Aluminum Association
2.	AAN	American Association of Nurserymen
3.	AAR	Association of American Railroads
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ACI	American Concrete Institute
6.	AGC	Associated General Contractors of America
7.	AI	Asphalt Institute
8.	AIA	American Institute of Architects
9.	AISC	American Institute of Steel Construction
10.	AISI	American Iron and Steel Institute
11.	AMCA	Air Moving and Conditioning Association
12.	ANSI	American National Standards Institute
13.	APA	American Plywood Association
14.	ARA	American Railway Association
15.	AREA	American Railway Engineering Association
16.	ARI	American Refrigeration Institute
17.	ASCE	American Society of Civil Engineers
18.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
19.	ASLA	American Society of Landscape Architects
20.	ASME	American Society of Mechanical Engineers
21.	ASTM	American Society for Testing and Materials
22.	AWG	American Wire Gauge
23.	AWPA	American Wood-preservers' Association
24.	AWPI	American Wood-Preservers' Institute
25.	AWWA	American Water Works Association
26.	AWS	American Welding Society
27.	CISPI	Cast Iron Soil Pipe Institute
28.	CRSI	Concrete Reinforcing Steel Institute
29.	DOT	U.S. Department of Transportation
30.	EEI	Edison Electric Institute
31.	EIA	Electronic Industries Association

32.	EPA	U.S. Environmental Protection Agency
33.	FHWA	Federal Highway Administration, Department of Transportation
34.	FSS	Federal Specifications and Standards
35.	FTA	Federal Transit Administration
36.	GSA	General Services Administration
37.	HUD	U.S. Department of Housing and Urban Development
38.	IACS	International Annealed Copper Standard
39.	IEEE	Institute of Electrical and Electronic Engineers
40.	IES	Illuminating Engineering Society
41.	IMSA	International Municipal Signal Association
42.	IPCEA	Insulated Power Cable Engineers Association
43.	ITE	Institute of Transportation Engineers
44.	JIC	Joint Industrial Council
45.	MBTA	Massachusetts Bay Transportation Authority
46.	NAAM	National Association of Architectural Manufacturers
47.	NBC	National Building Code
48.	NBS	National Bureau of Standards
49.	NEC	National Electric Code
50.	NEMA	National Electrical Manufacturers' Association
51.	NESC	National Electrical Safety Code
52.	NET&T	New England Telephone & Telegraph Company
53.	NFPA	National Fire Protection Association
54.	NLMA	National Lumber Manufacturers' Association
55.	OSHA	United States Department of Labor, Occupation Safety and Health Administration; and Occupation Safety and Health Act
56.	PCA	Portland Cement Association
57.	PCI	Prestressed Concrete Institute
58.	PEI	Porcelain Enamel Institute
59.	SAE	Society of Automotive Engineers
60.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
61.	SJI	Steel Joist Institute
62.	SSPC	Steel Structures Painting Council
63.	UBC	Uniform Building Code of the International Conference of Building Officials
64.	UL	Underwriters' Laboratories, Inc.
65.	USSG	United State Standard Gauge

1.3 PUBLICATION DATES

- A. Except as otherwise indicated, where compliance with an industry or trade association standard is required, comply with the standard in effect as of the date of the Contract Documents.

1.4 DEFINITION OF TERMS

- A. Wherever in the Contract Documents the following technical terms or pronouns in place of them are used, the intent and meaning shall be:
1. Aerial Structure - Any MBTA System structure other than a culvert, which carries transit tracks and spans above an earth or water surface.

2. Alignment - Horizontal and vertical location of a track, street or highway as described by curves and tangents.
3. Ballast - Specified material placed on the track bed to hold the track in line and elevation.
4. Base - A layer of material of planned thickness placed immediately below the pavement or surface.
5. Basement Material - Material in excavations or embankments, underlying the lowest layer of subballast, ballast, base, pavement, or other specified layer which is to be placed.
6. Bridge - A structure, other than a culvert, which carries railroad, highway, pedestrian, or other traffic, or a utility facility, and spans above an earth or water surface.
7. Culvert - A structure, other than a bridge or aerial structure, which provides an opening under a track or roadway for drainage or other purpose.
8. Frontage Road - A street or road generally paralleling a portion of the MBTA System for service to abutting or adjacent property.
9. Gauge (Track) - Distance between the inside faces of rails and measured 5 inch below the top of the center line of heads of running rails and at right angles thereto.
10. Guard Rail (Track) - A rail or other structure laid parallel with the running rails of a track to contain wheels after derailment, or to hold wheels in correct alignment to prevent their flanges from striking the points of turnout or crossing frogs or the points of switches.
11. Highway, Road, Street - Each is a term denoting a public vehicular way and includes the entire area within their right-of-way.
12. Layout Plans - Plans showing layout (location) lines, property lines, corner markers, names of property owners, and the location of bounds.
13. Location Lines - Lines indicating the limits of the Right-of-Way.
14. Material - Any substances specified for use in the construction of the Contract and its appurtenances.
15. Median - That portion of a divided highway separating traffic moving in opposite directions.
16. Pavement - Uppermost material placed on the traveled way or shoulders of a road or on a parking area. This term is used interchangeably with surfacing.
17. Right-of-Way - A Term denoting land and property, and interest therein, acquired by the Authority for construction of the MBTA System.
18. Running Rail - Rail or surface on which the tread of the wheels of rail vehicles bear.
19. Shoulder (Track) - That portion of the track subgrade or subballast which, when the track is in cut, lies between the ballast-covered portion and the ditch and, when the track is on embankment, lies between the ballast-covered portion and top of slope.
20. Sieves - All sieves referred to in the Specifications shall be standard woven wire cloth sieves and conform to the requirements of AASTHO Designation M92.
21. Subballast - Specified material placed on the finished subgrade and below the ballast.
22. Subbase - A layer or layers of specified material of planned thickness between the base and the basement material.
23. Subgrade (Pavement) - That area on which pavement, surfacing, base, or subbase is placed.
24. Subgrade (Track) - Finished surface of the track bed below the ballast or subballast.
25. Substructure - All that part of an aerial structure or bridge below the bridge seats, tops of piers, haunches of rigid frames, or below the spring lines of arches. Backwalls and parapets of abutments and wing walls of bridges shall be considered as parts of the substructure.
26. Subway - That portion of a MBTA Transit System line which is constructed beneath and approximately parallel to the ground surface regardless of its method of construction.
27. Superelevation - Vertical distance measured at the centerline of the rails that the outer rail is above the inner rail.

28. Superstructure - All that part of an aerial structure or bridge above the bridge seats, tops of piers, haunches of rigid frames, or above the spring lines of arches, including the floor, and not including the substructure.
29. Top of Rail Profile - Profile line representing the elevation of the top of running surface of rails. Where superelevation occurs, top of rail profile represents the inside lower running rail, unless otherwise indicated.
30. Track Bed - That portion of a MBTA Transit System line between the curb lines or outside boundaries of ballast or track support slab.
31. Trackway - That portion of a MBTA System line between outside of curbs where track is on aerial structure, tunnel, or subway; and between outside of cut slopes or parallel drainage ditches where track is at grade, including apportioning drainage structures.
32. Trackwork - Rails, switches, frogs, crossings, fastenings, pads, ties and ballast over which transit or railroad cars or trains are operated.

1.5 ADDITIONAL DEFINITIONS

- A. See the General Conditions and other Sections of the Specifications.
- B. See the Contract Drawings.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

Not Used.

END OF SECTION

SECTION 01151

MEASUREMENT AND PAYMENT (LUMP SUM)

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the general requirements for Measurement and Payment.
- B. Provisions of this Section are augmented by the measurement and payment provisions for specific classifications of construction, materials, and services as specified in the applicable sections of these Standard Specifications, the Contract Specifications and as listed in the Bid Form for a specific contract.
- C. See Specification Section 01322 – CONSTRUCTION SCHEDULE for additional requirements of processing the payment request.

1.2 MEASUREMENT OF QUANTITIES

- A. This Contract is a Lump Sum Contract with Allowance payment items. The Lump Sum base bid price shall reflect the total cost to complete the work indicated in the Bid Documents, whether shown or incidental to completing the work in accordance with applicable codes, laws, rules and regulations.
- B. Quantities of various items of work provided shall be determined from the As-Planned Schedule and subsequent Progress Schedules, for purposes of payment, by the Engineer; and by the Contractor for purposes of the certification(s) of work provided that are required by the provisions of Article 1.7.
- C. Upon the completion of Work and before final payment is made the Engineer will determine that all Work is completed according to the approved As-Planned Schedule and subsequent Progress Schedules, as the basis for final settlement.
- D. Method of measurement and computations to be used in determination of quantities of material furnished and of work provided under the Contract will be those methods generally recognized as conforming to good engineering practice.
- E. Unless otherwise specified, the following shall apply:
 - 1. Not used.
 - 2. Not used.
 - 4. Not used.
 - 5. Allowance will not be made for surfaces laid over a greater area than those indicated, or for any material moved from outside the area of cross section and lines shown on the Drawings except when specifically authorized by the Engineer.
 - 6. The term "gauge" when used in connection with the measurement of plates, will mean the U.S. Standard Gauge, except that when reference is made to the measurements of

galvanized or aluminum sheets used in the manufacture of corrugated metal pipe, metal place culverts and arches, metal cribbing and corrugated aluminum pipe, the term "gauge" will mean that specified in AASHTO Designations M36, M167, M196 or M197.

7. When the term "gauge" refers to the measurement of wire, it will mean the wire gauge specified in AASHTO Designation M32.
8. The term "pound" when used in the measurement or payment of any material or work, will mean 16 ounces avoirdupois, based on computed or scale weight.
9. The term "ton" when used in the measurement or payment of any material or work, will mean the short tone consisting of 2,000 pounds avoirdupois. When applicable, materials measured in pounds will be converted to tons.
10. Not used.
11. Not used.
12. Not used.
13. Not used.
14. Not used.
15. Not used.
16. The term "each," when used as an item of payment, such as project markers, right-of-way monuments, and the like, will mean complete payment for the work prescribed for that item.
17. The term "lump sum," when used as an item of payment, will mean complete payment for the work prescribed for that portion of the Contract work under the item, or all work prescribed in the Contract, as the case may be.
18. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.
19. The Quantities may be shown on the Contract Drawings for items for which lump sum is the method of measurement. If shown, the quantities are approximate and are shown for estimating purposes only. The Contractor shall ensure that the lump sum price (whether the base bid or lump sum breakdown per Activity (see Section 01322)) includes all labor, equipment and material to provide the Work complete in place.
20. The term "complete in place," when used in the measurement and payment provisions, means the completion of the contract item, including the furnishing of all materials, equipment, tools, labor and work incidental thereto, unless otherwise specified.
21. Rental of equipment will be measured by hours of actual working time and necessary traveling time of the equipment within limits of the Contract or between the source of supply and contract site (but not exceeding 100 miles) except when special conditions or other agreements make some other method of measurement desirable and is specified.

22. When standard manufactured items are specified such as fence, wire, plates, rolled shapes, culvert pipe, and the like, and these items are identified by gauge, unit weight, section dimensions, or other measurements, such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

1.3 SCOPE OF PAYMENTS

- A. The Authority will pay and the Contractor shall receive and accept the compensation as provided in the Bid Form, in full payment for furnishing all materials, labor, tools and equipment and for performing all work contemplated and embraced under the Contract; also for all loss or damage arising out of the nature of the Work, or from the action of the elements (except as specified in General Conditions Article 5.21), or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the Work (except as set forth in General Conditions Article 2.9 or as otherwise noted in the Contract Specifications) until its final approval by the Authority, and for all risks of every description connected with the prosecution of the Work; also for all expenses incurred by or in consequence of the suspension or discontinuance of the said prosecution of the Work (except as provided in General Conditions Article 6.7), and for any infringement of patent, trademark or copyright, and for completing the Work in an acceptable manner according to the Contract Documents.
- B. Payment of any current estimate, or any retained percentage shall in no way constitute an acknowledgment of the acceptance of the Work or in no way or degree prejudice or affect the obligation of the Contractor, at his own cost and expense, to repair, correct, renew or replace any defects and imperfections in the construction of, or in the strength of, or quality of materials used in or about the construction of the Work under Contract and its appurtenances, as well as damages due or attributable to such defects; which defects, imperfections or damages shall have been discovered on or before the expiration of the one year guaranty period specified in General Conditions Article 2.8. The Engineer shall be the sole judge of such defects, imperfections, or damages and the Contractor shall be liable to the Authority for failure to correct the same as provided herein. (Also see General Conditions Article 5.24.)
- C. If the "measurement and payment" clause in the Construction Specifications relating to any price in the Bid Form requires that said price cover and be considered compensating for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the Specifications.
- D. Except as specifically provided otherwise, no separate payment will be made for any work in fulfillment of the requirements of these Division 1, General requirements nor of the respective Specifications relating thereto, and all cost thereof shall be included in the lump sum bid price.
- E. Except as specifically provided otherwise, no separate payment will be made for any work in fulfillment of the requirements of the Contract Documents. All costs shall be included in the lump sum bid price.

1.4 COMPENSATION FOR ALTERED QUANTITIES

- A. The Contractor is obligated to bid work in a responsive and responsible manner. Prices proposed for the work must be realistic.

1.5 PAYMENT FOR EXTRA WORK

- A. Not used.
- B. Payment for extra work or materials.

1. If the Engineer directs additional work, the Contractor shall submit promptly in writing to the Engineer an offer to do the required work on a lump sum or unit price basis, as specified by the Engineer. Unless otherwise directed, the stated price shall be divided so as to show that it is the sum of: (a) estimated cost of direct labor, materials, and the use of equipment, plus 10 percent of this total for overhead; (b) actual cost of Workmen's Compensation and Employer's Liability Insurance, Health, Welfare and Pension Benefits, Social Security deductions, and Employment Security Benefits and such additional fringe benefits which the Contractor is required to pay as a result of Union Labor Agreements and/or is required by authorized governmental agencies; (c) a reasonable percent of the total (a) and (b) shall be negotiated for profit utilizing the procedure outlined under this Article, paragraph B.3; (d) the estimated proportionate cost of surety bonds.
2. Unless an agreed lump sum and /or unit price is obtained from above and is so stated in a Supplemental Agreement or an Extra Work Order the Contractor shall accept as full payment for work or materials for which no price agreement is contained in the Contract an amount equal to the following: (a) the actual cost for direct labor, material (less value of salvage, if any) and use of equipment (see below), plus 10 percent of this total for overhead; (b) actual cost of Workmen's Compensation and Employer's Liability Insurance, Health, Welfare and Pension Benefits, Social Security deductions, and Employment Security Benefits and such additional fringe benefits which the Contractor is required to pay as a result of Union Labor Agreements and/or is required by authorized governmental agencies; (c) a reasonable percent of the total (a) and (b) shall be negotiated for profit utilizing the procedure outlined under this Article, paragraph B.3; (d) the estimated proportionate cost of surety bonds. The actual cost of use of equipment (except small tools and manual equipment) will be the actual and necessary operating expenses of such equipment power and fuel for the same, and a reasonable rental for the same as determined by the Engineer.
3. A reasonable percent of the total (a) and (b) for Items 1 and 2 above shall be negotiated for profit on each Extra Work Order utilizing the following weighted guidelines:

(a) Breakdown:

Profit Calculation Summary Chart

FACTOR	WEIGHT	RATE	PROFIT
	(W)	FACTOR	VALUE
		(R=.03 to .08)	
1. Degree of Risk			
General Issues of Concern	10	x	=

Labor Productivity	15	x	=
Pricing	15	x	=
Availability of Materials	5	x	=
2. Relative Difficulty of Work	15	x	=
3. Size of Job	15	x	=
4. Period of Performance	15	x	=
5. Subcontracting	10	x	=
TOTAL	100		

(b) Based on the Factors for each Work Order, the Weight (W) for each Factor shall have a Rate Factor (R) from .03 to .08 as indicated below. The Profit Value (V) shall be obtained by multiplying the Rate Factor (R) by the Weight (W). The sum of the Profit Value column represents the fair and reasonable profit percentage as determined by the Factors of the particular Extra Work Order.

DEFINITION OF PROFIT RATE FACTORS

1. Degree of Risk:

Where the Work associated with a Extra Work Order involves no risk to the Contractor, or the degree of risk is very small, the Rate Factor should be .03; as the degree of risk increases, the Rate Factor should be increased up to a maximum of .08. The Degree of Risk has been determined to include but not limited to the following major factors:

- a) General Issues of Concern
- b) Labor Productivity
- c) Pricing
- d) Availability of Materials

2. Relative Difficulty of the Work involved:

If the modified Work is most difficult and complex the Rate Factor should be .08 and should be proportionately reduced to .03 on the simplest of jobs.

3. Size of job:

If the sum of the modified Work (direct costs) is not in excess of 5% of the base Contract work or \$25, 000, the Rate Factor shall be .08. Work greater than 10% of the base Contract Work or \$50,000 shall have a Rate Factor of .03. Work estimated between 5% (\$25,000) and 10% (\$50,000) shall be proportionately rated from .08 to .03.

4. Period of performance:

A change during the early phases of a contract shall have a Rate Factor of .03 and should be proportionately increased to .08 as the period of impact approaches the substantial completion. Additionally, the Rate Factor shall be >.03 for a time extension less than 10 days to a defined Milestone and as the potential time extension to a defined Milestones increases the Rate Factor shall also proportionately increase to .08.

5. Subcontracting:

The Rate Factor shall be inversely proportional to the amount of subcontracting. Where 66 percent or more of the Work is to be subcontracted, the Rate Factor shall be .08 and where 90% to 100% of the Work is performed by the Contractor's own forces the Rate Factor shall be .03. If the amount of subcontracting is estimated between 11% and 65% of the Work, the Rate Factor shall be proportionately rated from .08 to .03.

The term "direct labor" shall mean the labor actually expended in performing the required work exclusive of all supervisory labor.

No allowance will be made for general superintendence and the use of small tools, manual equipment, or buildings.

For extra work performed by a subcontractor under this Article, paragraph B.2. above the Contractor shall accept as full payment therefore an amount equal to the following: (a) the subcontractor's cost computed as described above plus (b) an additional 10 percent of such costs. Said subcontractor's cost must be reasonable and approved by the Engineer.

The Contractor shall, when requested by the Engineer, furnish itemized statements of the cost of the work ordered and give the Engineer access to accounts, bills, and vouchers relating thereto, and unless the Contractor shall furnish such itemized statements, access to accounts, bills and vouchers, the Contractor shall not be entitled to payment for which such information is sought by the Engineer.

C. Equipment Rates

In the event there arises the need for determination of costs for use of equipment as part of "actual costs" or "cost of performance" or "damages" under General Conditions, Section 00700, Articles 2.9, 5.19, 6.7; Section 01151, Measurement and Payment, Articles 1.03 and/or 1.05; or under Chapter 30 of the Massachusetts General Laws, such costs for use of equipment shall be established in accordance with the following:

1. "Construction equipment" as used herein means equipment in sound workable condition, either owned or controlled by the Contractor or the subcontractor at any tier, or obtained from a commercial rental source, and furnished for use under the Contract.
2. Allowable hourly ownership and operating costs for Contractor-owned or subcontractor-owned equipment shall be determined as follows:
 - a. Actual cost data from the Contractor's accounting and operating records shall be used whenever such data can be determined for hourly ownership and operating costs for each piece of equipment, or groups of similar serial or series equipment. Actual costs shall be limited to booked costs of the annual accounting period or periods during which the equipment was utilized on the Contract, and will not include estimated costs not recorded and identifiable in the Contractor's formal accounting records. The Contractor shall afford Authority auditors full access to all accounting, equipment usage, and other records necessary for development or confirmation of actual hourly cost rates for each piece of equipment, or groups of similar serial or series equipment. The Contractor's refusal to give such full access shall invalidate any request or

claim for payment of the equipment costs. When costs cannot be determined from the Contractor's records, hourly equipment cost rates may be determined under "b." below.

- b. When the Engineer ascertains that it is not practicable to determine actual equipment cost rates or elements thereof from the Contractor's records, hourly equipment cost rates or elements shall be determined by the use of rate schedules or the formula developed from the "Rental Rate Blue Book" (Volume 1) published by Equipment Watch.:

- (1) Hourly rates shall be developed by dividing monthly rates by 176 hours per month (the "weekly," "hourly" and "daily" rates listed in the "Blue Book" will not be used);
- (2) Rates shall in all cases be adjusted by application of Rate Adjustment Tables (machine age adjustment) plus adjustment to eliminate Equipment Overhead plus Regional Adjustment; and
- (3) Rates shall be further reduced by 20 percent to eliminate duplicate and excessive costs, except that the rates shall instead be reduced by 75 percent to determine standby rates.

The number of hours to be paid for shall be the number of hours that the equipment is actually used on a specific force account activity. The "current revisions" to the Blue Book will be used in establishing rates. The "current revision" applicable to specific force account work will be the "current revision" as of the first day of work performed on that force account work and that rate will apply throughout the period the force account work is being performed. In all cases, the Engineer reserves the right to utilize, in preference to Blue Book rates, equipment cost rates based upon actual costs per accounting records or hybrid rates as described above.

- c. In those cases where a 10 percent additive for overhead is to be superimposed on the equipment costs provided in Section 00700, Article 2.9, and Section 01151, Article 1.5, equipment cost rates determined under (a) and (b) shall exclude any overhead costs such as equipment insurance, licenses or taxes. The 10 percent additive shall compensate the Contractor for all overhead costs, including equipment overhead, general superintendence, small tools, manual equipment, field overhead and central office overhead. Where the 10 percent overhead additive is not applicable, overhead items clearly related to equipment, (equipment insurance, licenses, taxes), shall be included in the equipment rates; provided, however, that such costs shall be identified and eliminated from any other direct or indirect costs or damages payable by the Authority under the Contract. No element of profit shall be allowable in equipment cost rates for Contractor-owned equipment; it being understood that a reasonable percent of profit in accordance with Article 1.5, Paragraph B, Item 3 will be superimposed upon equipment costs when called for by the Contract.

3. Reasonable hourly costs of renting equipment are allowable subject to Contractor production of auditable records supporting actual costs incurred, provided further that:

- a. Costs such as fuel, lubricants, and minor or running repairs incident to operating such rented equipment that are not included in the rental rate are allowable.
 - b. Costs incident to major repair and overhaul of rental equipment are not allowed.
 - c. Charges for equipment leased or rented from any division, subsidiary organization under common control, or business under common ownership, ordinarily will be reimbursable to the extent that they do not exceed the actual costs of ownership and operating costs determined as in "2.", above. Rental cost of equipment leased or rented from any division, subsidiary, affiliate of the Contractor under common control, or business under common ownership, that has an established practice of renting out the same or similar equipment to unaffiliated parties, shall be allowed at rates higher than actual ownership and operating costs, provided that the Contractor furnishes the Authority adequate documentation, including the rental and usage records for the same or similar equipment items, demonstrating a reasonable likelihood that the equipment would have been rented out if not used on this Contract, and that the rental rates charged are consistent with rates charged to unaffiliated parties and going market rates. Rental costs under a sale and leaseback arrangement will be allowable only up to the amount the Contractor would be allowed if the Contractor retained title.
4. Equipment cost rates determined in "2." and "3." above shall be exclusive of labor cost of equipment operators. Such costs shall be reimbursable subject to Contractor production of auditable payroll and other records sufficient for determination of hours, pay rates, and reimbursable fringe costs as defined in Section 00700, Article 2.9 and above.
5. Except in cases of unit price or lump sum extra work orders approved by the Engineer before the work is done, actual reimbursable hours of equipment usage and operator time must be adequately documented by the Contractor's field and office records maintained during performance of the work in a manner acceptable to the Engineer. Failure of the Contractor to so maintain time records which adequately segregate added equipment hours caused by extra work required by the Engineer, or caused by other Authority actions cited in the Contractor's claim for damages, from other equipment time worked on the Contract, when maintenance of such records would have been feasible, shall constitute a cardinal omission of the Contractor, invalidating any claim for equipment cost reimbursement.
- D. Payment for specialized engineering services which may be required in the performance of extra work and which is not otherwise provided for in the Contract shall be for actual costs to be incurred that comply with the standards of the Federal Acquisition Regulations, Part 31, including (a) direct labor based on hours worked on the Contract at the hourly rates paid; (b) overhead costs based on audited financial statements and other data as may be required by the Authority; (c) ten percent of the total of (a) and (b); and (d) other direct expenses related to the Contract.

1.6 OMITTED ITEMS

- A. Should any item or items of Contract work be determined unnecessary for the proper completion of the Work, the Authority may, upon written notice to the Contractor, eliminate such item or items from the Contract and allowance will not be made for such items so eliminated in making

final payment to the Contractor, except for such actual work as shall be done and materials purchased, including the cost of moving in and out the special equipment necessary for work on the eliminated item or items, prior to notification of the elimination of such item or items. The amount of the credit to the Authority shall be determined in a similar manner as described above for payments for extra work. This Article shall also apply to work eliminated from the Contract Documents in the form of a lump sum credit to the Authority.

1.7 PARTIAL PAYMENTS

A. Monthly, the Engineer will make an estimate in writing of the total amount of the work done to the date of such estimate and the value thereof, including advance payments on materials stores or on hand but not yet incorporated in the Work which may be made as provided in Article 1.8 of this Section. This estimate shall be based on the Contractor's As-Planned Cost/Resource Loaded Schedule and Progress Schedule Updates returned as "Resubmittal not Required". The Authority will retain the following from these payments:

1. Five percent of the approved amount of the payment to secure satisfactory performance of the Contract Work.
2. An amount sufficient to cover claims it has against the Contractor.
3. An amount sufficient to cover all demands for direct payment filed by subcontractors under Chapter 30 Section 39F of the General Laws of the Commonwealth.
4. Five percent of the value of all items to be planted in the ground.

The Authority will pay monthly to the Contractor while carrying on the work the balance not retained as hereinbefore provided. No such estimates or payment shall be required to be made when, in the Engineer's judgment, the work is not proceeding in accordance with the provisions of the Contract, or when in his judgment the total value of the work done since the last estimate amounts to less than \$500.00.

B. The Authority may, at its option, after 50 percent of the Work has been completed and (1) if the work is proceeding in accordance with the approved CPM Construction Plan submitted under Section 01322 Article 1.2 and (2) is being performed in accordance with the Specifications and the Contract, not retain the 5 percent to secure satisfactory performance of the Contract Work as provided in Article 1.7A of this Section 01151 on any subsequent payments. The contractor must formally request and seek approval from the Authority to stop retaining the 5 percent. The MBTA Project Office must also submit a memorandum to formally request approval from Contract Administration on the releasing of the 5 percent retainage. However, if the Authority does not retain these monies, it will reimpose this 5 percent retainage on all subsequent payments should the Contractor fail to maintain progress in accordance with the Contract and approved schedule or fail to execute the Work as required by the Specifications and Contract. Retainages withheld under Articles 1. 7A (2) and (3) will remain in effect throughout the Contract Work period as detailed therein. Retainage withheld under Article 1.7A (4) for plantings will be retained until Final Acceptance (Article 1.10).

C. Partial payments will be made on lump sum contracts, and on lump sum items of a contract if the Contractor requests partial payment of such an item, in accordance with a schedule of the quantities and unit prices for the major components of a lump sum contract or of the lump sum items of a contract, to be submitted by the Contractor and approved by the Engineer prior to

making partial payments for such contract or for such items. For lump sum contracts, this schedule of major components shall approximate the activities shown on the CPM Construction Plan required by Section 01322 Article 1.2. Each component part shall be considered as including all its concomitance so that the total cost listed for the components is the contract cost for the item. Approval of the schedule by the Engineer shall not be considered as a guarantee to the Contractor that the quantities shown on the schedule are the approximate quantities actually included in the lump sum items. The schedule is only for the purpose of estimating partial payments, and it shall not affect the contract terms in any way.

- D. The Contractor shall certify in writing on forms approved by the Authority that the work for which payment is included in the estimate in question, has in fact been done.
- E. Whenever the Work is substantially complete, the Authority may, if it considers the amount retained to be in excess of the amount adequate for its protection, at its discretion, release to the Contractor all or a portion of such excess amount and may cause the Contractor to be paid, temporarily or permanently, from time to time, such portion of the reserve as it deems prudent.
- F. When the first partial payment estimate is prepared, the Contractor shall submit to the Engineer a cash drawdown forecast indicating the estimated amount of each partial payment by month, projected through completion of the project. The Contractor shall, with each succeeding partial payment estimate, submit updated cash drawdown forecasts to the Engineer. The forecast is for the purpose of estimating cash requirements.
- G. Massachusetts Bay Transportation Authority-Statement of Payment to Subcontractors Form is included at the end of this Section 01151. It must be completed and signed by authorized contractor representative and submitted to the Authority with each payment request.
- H. With each partial payment estimate, the Contractor shall submit, at a minimum, the following information which is extracted from the As-Planned Schedule:
 - a. Progress Schedule Submittal # that is the basis for the partial payment request
 - b. Activity ID
 - c. Activity Description
 - d. Budgeted cost for each Activity in the Lump Sum contract
 - e. Value completed this period
 - f. Percentage completed this period
 - g. Value completed to date
 - h. Percentage completed to date
 - i. Balance of budgeted cost per activity
 - j. Separate information must be provided per DBE Subcontractor, including:
 - 1. DBE budgeted cost
 - 2. DBE value completed this period

3. DBE percentage completed this period
 4. DBE value completed to date
 5. DBE percentage completed to date
 6. Balance of DBE value
 7. Other information required by MBTA Contract Administration
- I. Failure to provide this information with each partial payment request will result in non-payment by the Authority
- J. All material incorporated into the Work shall become the sole property of the Authority, but this shall not be construed as relieving the Contractor from the sole responsibility for all material and Work under the Contract or for the restoration of any damaged Work or waiving the right of the Authority to require the fulfillment of all the terms of the Contract. The Authority shall retain all rights under the Contract including without limitation the right to reject material subsequently found unsatisfactory and the right to enforce the provisions of Section 5.21 and 5.24 of the Contract.

1.8 PAYMENT FOR MATERIALS STORED OR ON HAND

- A. When requested in writing by the Contractor, allowances may be made on partial payments for certain materials stored or on hand, but not incorporated in the Work, subject to the following terms and conditions.
- B. Upon presentation to the Engineer by the Contractor of copies of paid invoices, advance payments may be made for acceptable reinforcing steel, structural steel, piles, culvert pipe, guard rail, track rails, precast prestressed concrete members, costly machinery items, and other similar nonperishable materials purchased expressly for the Work and delivered on or in the approved storage places at the site, but which materials are not considered as erected or complete in place under the items of the Contract, and for which partial payment would not otherwise be made until such materials and items were erected or complete in place.
- C. The amount to be included in the estimate will be the value of the materials as shown by the certified copies of paid invoices including transportation and handling costs. However, the Engineer reserves the right to limit payment for such materials when such payment is based upon a standard unit of measure. When contract payments are made on the basis of estimated quantities, payment for material stores or on-hand may be limited to an amount not to exceed the value of ninety percent of the estimated contract quantity.
- D. Before any advance on materials is made as hereinbefore provided, the Authority will require, as security for the incorporation of the materials in the Work, documents from the Contractor transferring to the Authority the absolute legal title to such materials.
- E. However, the transfer of title and the partial payment for such materials shall not in itself constitute acceptance of same nor void the right to reject material subsequently found unsatisfactory as provided in General Conditions Article 4.4, nor in any way relieve the Contractor of his responsibility for satisfactorily furnishing and placing the material in the Work in accordance with the terms of the Contract.

- F. In the event any of such material subsequently becomes lost, stolen, impaired, or damaged, the monetary value of the lost, stolen, impaired, or damaged material as may have been paid for in a current estimate will be deducted from the next estimate, and no further payment will be made therefor until such material has been satisfactorily replaced in accordance with Specification requirements.
- G. If it is impossible due to lack of area on the site or other valid reason, the Contractor may request in writing permission from the Engineer to store materials off the site and still have the materials paid for as materials on hand and the Engineer may approve payment; however, no advance payment for material stores off the site will be made until written approval of the Engineer has been given. This request will state the reason for the request, location of proposed storage site, and methods that will be employed to insure that material is properly protected and will be used on the particular Contract. The amount to be included in the estimate for materials stores off the site will be limited to 80 percent of the value of the materials as shown by the certified copies of paid invoices including transportation and handling costs.
- H. In the case of property not owned or controlled by the Authority, the Contractor shall also lease, or procure a lease, free from encumbrances to the Authority, such lease to be in a form approved by the Authority and to contain provisions for the protection and indemnification by the Contractor of the Authority, its employees and agents, against all claims by reason of such lease or by reason of anything done or permitted in or upon the leased sites. The Contractor shall also take such steps as the Authority may require for the purpose of security and assuring to the Authority the control of such materials, particularly the right to enter upon the property, take possession of such materials and use the same.
1. No advance payment for materials stores or on-hand, but not incorporated in the work, will be made in an estimate when the value therefor amounts to less than \$10,000 per contract bid item and represents the value of at least fifty percent of the estimated quantity involved as shown in the contract or as determined by the Engineer.
 2. Deductions at rates and in amounts which are equal to the advance payments will be made under the appropriate Contract pay items in estimates as the materials are incorporated in the Work.

1.9 SEMI-FINAL ESTIMATE

- A. A semi-final estimate may be made, at the discretion of the Authority, under the following conditions:
1. If, after final inspection has been made, there are any payments or Extra Work items that are in dispute between the Contractor and the Authority, either as to the quantity or value of work provided thereunder, such items or claims may be excluded from the final estimate, and payment for such disputed items may be deferred until such time as agreement has been reached between the Contractor and the Authority or until such claim has been adjudicated. In such case, a semi-final estimate shall be prepared within a period of 65 days after substantial completion of the Contract Work covering the value of Work provided and retained percentage on items of the Contract that are not in dispute and with disputed items or claims excluded but subject to deduction and retention of a sum sufficient to satisfy any and all outstanding claims or liens that have been duly filed by subcontractors and materialmen against the Contractor, or to cover amount of such claims or liens that may have been paid by the Authority directly to others for the Contractor's

account (see General Conditions Article 5.17), and subject to deduction and retention from such payment any other amounts to be deducted and retained in accordance with the terms of the Contract. The existence of a dispute between the Contractor and the Authority as to any payment item or items shall not be considered a valid reason for delaying preparation of a semi-final estimate as provided herein.

2. In the event the Contract has been substantially completed and the Contract has been opened to public use by order of the Authority, but final acceptance of the Work is subject to delay because of minor uncompleted items which do not impair the usefulness of the Contract, a semi-final estimate shall also be prepared within a like period of 65 days after the Contract has been substantially completed and placed in public use. Such semi-final estimate shall include an intimate of the value of all Work provided in accordance with the terms of the Contract, including the amount of retained percentage withheld by the Authority from previous periodic payments, but excluding (a) the same deductions and retainage sufficient to cover subcontractors and materialmen's claims and other amounts to be deducted and retained in accordance with the terms of the Contract, as provided by the first paragraph of this Article; (b) an amount equal to the estimated value of the work remaining to be performed and (c) any items or claims for extra Work, or parts thereof, that may be in dispute; and payment for such excluded items or portions thereof, may be deferred until such remaining work has been satisfactorily completed, or in the case of disputed items or claims until such time as agreement has been reached thereon or such claims have been adjudicated.

1.10 FINAL ACCEPTANCE AND FINAL PAYMENT

- A. When all of the physical work covered by the Contract has been substantially completed (see General Conditions Article 3.11), the Authority will inform the Contractor in writing the date of such final acceptance upon which date the Contractor's responsibility shall cease except as provided in his bond and as provided in General Conditions Articles 2.8 and 5.24.
- B. The Engineer shall, as soon as practicable after the satisfactory completion of the Contract, make a final estimate of the amount of work done thereunder and value of such work. Within 65 days from and after the date the Work has been accepted by the Engineer, the Authority will forward to the Contractor a copy of the final estimate or semi-final estimate, as stipulated in Chapter 30 section 39G of the General Laws of the Commonwealth, which will include an agreement form for the Contractor's acceptance. After such acceptance has been filed with the Engineer, payments of the entire sum will be made, so found to be due thereunder after deducting therefrom all previous payments and all amounts to be kept and all amounts to be retained under the provisions of the Contract. All prior partial estimates and payments will be subject to correction in the final estimate and payment. If within six months from the date the final estimate is forwarded to the Contractor, the Contractor has not filed a valid (as determined by the Engineer) written reason(s) for not accepting final estimate, final estimate will be considered acceptable to the Contractor and payment of final estimate made.
- C. Acceptance by the Contractor of the final payment shall operate as and will be a release to the Authority and every member, agent, and employee thereof, from all claim and liability to the Contractor for anything done or furnished for, or relating to, the Work, or for any act or neglect of the Authority or of any person relating to or affecting the Work, except the claim against the Authority for the remainder if any there be, of the amounts kept or retained to satisfy liens or claims pending against the Contractor.

MBTA-CA: Subco

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY – STATEMENT OF PAYMENT TO M/W/DBE SUBCON

CONTRACT NO.
PAYMENT NO.
NET PAYMENT

(General contractor's

[illegible][illegible]

GRAND TOT.	\$0.00				
<i>(Per Article II, paragraph B, in Appendix 3 of subject contract)</i> <i>(Total M/W/DBE Payments divided by Awarded Contract)</i> <i>(Total Subcontract Payments divided by Awarded Contract)</i> <i>(Grand Total Subcontract Payments divided by Awarded Contract)</i>					M/W/DBE Stated Goal M/W/DBE Participation Subcontract Participation Grand Total - Participation

I hereby certify, under pains and penalties of perjury, that all information provided herein is complete and accurate:
Signed:

Authorized Contractor Representative

Date _____

(S): Refers to "M/W/DBE Suppliers"— amount shown is 60% of DBE Award Value

End of Section

MBTA-App

SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.1 DESCRIPTION

This Section specifies the general requirements and procedures for preparing and transmitting data to the Engineer for his information, acceptance or approval. Detailed requirements for submittals are specified in applicable Sections of these Standard Specifications and in the Construction Specifications.

1.2 SUBMITTALS (SHOP DRAWINGS, WORKING DRAWINGS AND MISCELLANEOUS)

A. Definitions

1. Shop Drawings: Original drawings, submitted to the Engineer by the Contractor pursuant to the Work, including, but not limited to: stress sheets, working drawings, diagrams, illustrations, schedules, performance charts, brochures, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, or other supplementary plans or similar data which are prepared by the Contractor or a Subcontractor, manufacturer, supplier or distributor, and which the Contractor is required to submit for review and approval by the Engineer.
2. Working Drawings: Contractor prepared plans for temporary structures and facilities. Working Drawings for elements of work which may affect safety of persons or property included but are not limited to Contractor's plans for temporary structures such as decking, temporary bulkheads, support of utilities, and for such other work as may be required for construction but which do not become an integral part of completed project.
3. Miscellaneous Submittals: Those submittals directly related to the work (non-administrative) including quality assurance program, resume of QA Managers, warranties, guarantees, maintenance agreements, maintenance of traffic plan, project photographs, survey data and reports, physical work records, quality testing and certifying reports, record and as-built drawings and data, operating and maintenance manuals, security and protection lists (including keying) and other similar information and materials not defined as shop drawings, working drawings, product data, samples mockups or sample panels.

- B. Within 15 calendar days of receipt of Notice to Proceed, submit to Engineer, Schedule of all submittals required by the contract. Submit schedules for submission of shop drawings, working drawings, mock-ups, sample panels, product literature and miscellaneous submittals in that order of priority which reflects sequence of construction requirements, project schedule logistics, and include anticipated review time that may be required by Contractor and Engineer for these submissions. If complexity of submittal requires more time for review, show approximate extended number of days required. Show all submittals on progress schedules required by Section 01322 – CONSTRUCTION SCHEDULE (LUMP SUM). Submittal schedules shall contain the following information as a minimum:

1. Submittal number, including revisions.
2. Specification section and paragraph reference.
3. Submittal title and description

4. Date needed to support construction schedule.
5. Date sent to Engineer.
6. Date returned from Engineer
7. Comments. Included within this section will be references to any new RFIs issued as a result, reasons for delay and any other relevant information.

C. General Procedures

Transmit submittals sufficiently in advance of construction requirements to permit a maximum of 30 calendar days for checking and appropriate action by Engineer.

Submit all work related submittals as defined in this Section and as required by Contract Documents on a Transmittal Form: Prepare draft of required transmittal form and submit it to Engineer for acceptance. At a minimum, furnish: transmittal forms sequentially numbered and show contract number, project name, date; names of subcontractors, suppliers, manufacturers, and required specification references; category and type of submittal, purpose, description, distribution record (for both transmittals and submittals) and signature of transmitter.

1. Examine and check submission for accuracy, completeness, and compliance with Contract before delivery to Engineer.

Stamp and sign each submission with following statement: "Having checked this submission, we certify that it conforms to the requirements of the Contract in all respects, except as otherwise indicated."

By reviewing and approving each submittal, Contractor represents that he has determined and verified materials, field measurements and field construction criteria related thereto, and has checked and coordinated information contained within such submittals with requirements of Work and Contract.

Submit one construction material or one drawing per submittal review.

2. Maintain at site of Work a complete up-to-date, organized file of all past and current submittals including an index and locating system, which identifies the status of each submission.
 - a. Assign sequential numbers to each submittal.
 - b. Assign new submittal numbers to all re-submissions and cross-reference to previous submittals.

Certify shop drawings, working drawings and calculations as submitted by a professional engineer registered in the Commonwealth of Massachusetts when required by individual Specification Sections. Convey, or be accompanied by, information sufficient to completely explain the structures, machines, or systems described and their intended manner of use. When professional certification is required by Contract requirements, Engineer is entitled to rely upon accuracy and completeness of such calculations and certifications.

3. Engineer's Review and Action
 - a. The Engineer will review and approve or take other appropriate action upon Contractor's submittals only for the limited purpose of reviewing for conformance with information given and design concept expressed in Contract requirements. The Engineer's action will be taken as to cause no delay in Work or in activities of

Contractor. Review of such submittals is not conducted for purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain responsibility of Contractor as required by Contract. Engineer's review will not constitute approval of safety precautions or, unless specifically stated by Engineer, of any construction means, methods, techniques, sequences or procedures. Engineer's review of a specific item does not indicate approval of entire assembly of which the item is a component.

- b. Time required for review of submittals and resubmittals by Engineer will be a maximum of 30 calendar days, except as otherwise specified.
- c. All Contractors' submittals will be stamped with one of following dispositions:
 - 1) **NO EXCEPTIONS TAKEN:** Work may proceed, provided it complies with Contract. Approval of shop drawings and samples will be general, but approval is not construed:
As relieving Contractor of responsibility for any errors or omissions, including details, dimensions, and quantity of materials; or

As approving departures from details furnished by Engineer.

- 2) **EXCEPTION AS NOTED:** Work may proceed, provided it complies with Contract and changes shall be made by Contractor. Resubmission not required. Exception, as noted, will be general.
The above dispositions will be general, but approval or exceptions noted shall not be construed as:

- Permitting any departure from Contract requirements;
 - Relieving Contractor of responsibility for any errors or omissions, including details, dimensions, and quantity of materials; or
 - As approving departures from details furnished by Engineer.

- 3) **REVISE AND RESUBMIT:** Work recognized as not being able to proceed.
Revise submittal in accordance with notations thereon and resubmit without delay.

- d. Handle re-submissions in the same manner as first submittals. On re-submissions, direct specific attention in writing to revisions other than the corrections on previous submissions. Make any correction required by Engineer.
- e. Failure of any material to pass specified tests is sufficient cause for refusal to consider, under this Contract, further samples of same brand or make of that material. Engineer reserves right to disapprove any material or equipment previously proven unsatisfactory in service.
- f. Samples of various materials on site, stored or in place may be taken by Engineer for testing. Samples failing to meet Contract requirements will automatically void approval of items tested. Replace such materials or equipment to meet Contract requirements. When tests are required, make only one test of each sample. Samples that do not meet specified requirements will be rejected. Additional testing of samples will be made by Engineer at Contractor's expense.

D. Requirements for shop drawings.

- 1. Shop drawings shall include stress sheets, fabrication details, bending schedules for reinforcing steel, location and details of construction joints in concrete, catalog cuts of

- equipment or fixtures, wiring or piping diagrams, data sheets and performance curves for electrical, mechanical, or other equipment and any other supplementary data required by the Engineer.
2. Detail drawings for cribs, cofferdams, falsework, shoring, decking, form work, and for other temporary work and methods of construction the Contractor proposes to use, will be required to be furnished. Such drawings shall be subject to review, but details of design will be left to the Contractor who shall be responsible for the safety and successful construction of the Work. Drawings, the original design for which is the responsibility of the Contractor, shall bear the seal of a Professional Engineer registered in the Commonwealth.
 3. Shop drawings shall show design, dimensions, connections, and other details necessary to insure that the Contract Documents are accurately interpreted. Shop drawings shall show proper connections with adjoining work in detail. Where adjoining work requires shop drawings, such drawing must be submitted for approval at the same time so that connections can be accurately checked.
 4. Shop drawings shall establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work and amplify design details of mechanical and electrical equipment in the physical spaces in any structure and incorporate minor changes of design or construction details to suit actual conditions. Where separate sections or trades are involved, shop drawings shall be coordinated and where required by the Engineer shall be submitted in composite form (coordination drawings) clearly designating which trade will perform which work; the words "work by others" will not be accepted.
 5. All requests for approval of materials and equipment and submissions of drawings shall indicate the corresponding number of the section and paragraph of the Specifications and reference to the Contract Drawing sheet numbers under which each of the above are required, and the Construction Performance Monitoring (CPM) activity number.
 6. All shop drawings shall be thoroughly checked by the Contractor for compliance with the Contract Documents before submitting them to the Engineer for approval and shall bear the Contractor's stamp of approval certifying that they have been so checked. Shop drawings submitted without the stamp of approval and certification, or which are incomplete, contain numerous errors, have not been checked, or have been checked only superficially will be returned unchecked by the Authority for resubmission by the Contractor. The Contractor shall certify: "This shop drawing has been thoroughly checked and complies with the Contract Documents and field measurements and the item fits with adjoining work except as noted."
 7. In checking shop drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the shop drawings with the requirements of all other Sections, adjoining materials or trades whose work is related thereto, as required for the proper and complete installation of the work.
 8. Nothing in the above shall be construed to hold the Contractor liable for the design of any of the permanent structures.

E. When submitting shop drawings or working drawings for approval or review by the Engineer, the following procedures shall apply:

1. Submit to the Engineer with such promptness as to cause no delay in his work, two copies of reproducible transparencies (equal to Ozalid Sepia), and two blackline prints checked and approved by him, of all shop drawings and detail drawings required for the work.
2. The Engineer will make a prompt decision on approval of such Drawings no later than 30 days after submittal; but if such decision requires extended investigation and study, the

Engineer will, within 30 days after the receipt of the submission, give the party making the submission written notice of the reason why the decisions cannot be made within the 30 day period and the date by which the decisions will be made.

3. Markings of approval, or of corrections required, will be made on the transparencies by the Engineer and record copies made by the Engineer for his own use will be at the Authority's expense.
 4. If corrections are required by the Engineer, make such corrections and resubmit the drawings, again as two reproducible transparencies and two blackline prints, to the Engineer for approval. If corrections are still required, the same procedure shall be carried out until the drawings are acceptable.
 5. Upon the Engineer's approval, furnish the Engineer two corrected blackline prints.
 6. All items shown on shop drawings shall be clearly identified with their location in the Contract, or by the sheet or detail number in which they appear, in order to facilitate checking by the Authority.
- F. Upon completion of the Work, submit to the Engineer a 35 mm microfilm of each shop drawing only, which shall become the property of the Authority. Microfilm copies shall be made on 35 millimeter black and white microfilm of archival permanent quality and mounted on aperture cards with the title of the drawing typed on the upper portion of the card.
- G. Resolution and density of the developed microfilms shall meet or exceed the Requirements of the U.S. Department of Defense Specification MIL-M-9868D, and shall contain no scratches, abrasions or fog.
- H. Portions of the developed microfilm, which do not meet those requirements, shall be replaced, at no expense to the Authority.
- I. Contract prices shall include the cost of furnishing all shop and detail drawings as specified and microfilms.
- J. Progress Photographs - Progress photographs are required to be taken by the Contractor. Ten 8x10-inch color photographs (including slides of these photographs) of progress and construction operations shall be required each month.

1.3 QUALITY CONTROL

A. SAMPLES AND TESTS

1. Inspection and sampling of materials will be carried out, ordinarily at the source or at the site of the Contract Work in accordance with established policies and procedures of the Authority, but the Authority will not assume any obligation for the inspection and sampling of materials at the source. Responsibility for incorporating satisfactory material in the Work rests entirely with the Contractor.
2. Furnish to the Engineer samples specified in the various specification sections. Prepay shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved in writing by the Engineer.
3. Unless otherwise indicated, submit not less than two identical samples of each type required. Label each sample indicating:
 - a. Name of project and contract number;
 - b. Name of contractor and subcontractor;
 - c. Material or equipment represented;
 - d. Source;

- e. Name of producer and brand (if any);
 - f. Specification Section, article, and paragraph; and
 - g. Location in project.
4. Mail, under separate cover, a letter in triplicate submitting each shipment of samples and containing the information required in Article 1.04C of this Section. Enclose a copy of the submittal letter with the shipment and a copy to the Engineer. Approval of a sample shall be only for the characteristics and use named in the submittal and approval, and will not be construed to change or modify any Contract requirement. Before submitting samples, the Contractor shall assure himself that the materials or equipment will be available in the quantities required in the Contract, as no change nor substitution will be permitted after a sample has been approved unless approved by the Engineer in writing.
 5. Approved samples not damaged in testing may be incorporated in the finished work if marked for identification and approved by the Engineer. Materials incorporated in the Work shall match the approved samples.
 6. Failure of any material to pass the specified tests will be sufficient cause for refusal to consider, under the Contract, any further samples of the same brand, make, or source of that material. The Engineer reserves the right to disapprove any material, which has previously proven unsatisfactory in service.
 7. Samples of various materials or equipment delivered on the site or in place may be taken by the Engineer for testing. Failure of samples to meet Contract requirements will automatically void previous approvals of the item tested.
 8. As soon as possible and a minimum of 35 days in advance of the time when placing of bituminous or Portland cement concrete is expected to begin, deliver to the Authority Laboratory samples and available analysis of concrete ingredients. Quantities of materials, aggregate sizes, cement, admixtures, and bitumens as may be required for the performance of necessary tests and trial mixes will be determined by the Authority's Materials Testing Engineer.

1.4 REQUESTS FOR INFORMATION

- A. Upon discovery of the need for interpretation of the Contract Documents, the Contractor shall prepare and submit a Request for Information (RFI) on the form specified at the end of this Section. RFIs shall not be used to request approval of submittals, request approval of design changes or substitutions, nonconforming conditions, or requests for changes to Contract schedule and/or Quantities.
 1. RFIs shall be issued by the Contractor to the Engineer. RFIs submitted by entities other than the Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the work.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project Name
 2. Contract Number
 3. Date
 4. Name of Contractor
 5. RFI Number, numbered sequentially
 6. Specification Section number and title and related paragraphs, as appropriate
 7. Drawing number and detail references, as appropriate
 8. Field dimensions and conditions, as appropriate

9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Completion Date or Quantities, Contractor shall state the impact in the RFI.
10. Contractor's signature
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe item needing interpretation.

C. RFI Log: Prepare, maintain and submit a log of RFIs organized by the RFI number containing the following information:

1. Project Name
2. Project Contract Number
3. Name of Contractor
4. RFI number and Revision Indicator
5. RFI Description
6. Date RFI was submitted
7. Date Response Required
8. Date Response Received
9. Date Closed

D. Engineer's Action: Engineer will review each RFI, determine action required and return to the Contractor within 30 days. Any change to the Contract Completion Date or Quantities may result in a change being submitted under Article 2 – Scope of Work of Section 00700 – GENERAL CONDITIONS.

1.5 GENERAL

No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of Work to which they pertain.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.



MBTA Request For Information

RFI No. _____

CONTRACTOR: _____

CONTRACT NO. R20CN01

AFFECTED DOCUMENT (S): SPEC: _____

DWG (S): _____ OTHER _____

DESCRIPTION:

JUSTIFICATION:

SIGNATURE: _____

DATE: / /

RESPONSE:

DESIGNER: _____

DATE: / /

MBTA PROJECT MGR: _____

DATE: / /

END OF SECTION

SECTION 01322 (LUMP SUM) CONSTRUCTION SCHEDULE

1.1 DESCRIPTION

- A. This Section specifies the general requirements and procedures for preparing and submitting Contract Schedules to the Authority for review and acceptance.
- B. Refer to Section 01151 regarding payment requirements associated with the schedule.
- C. Refer to Section 00700 Article 6.6, 6.7 and 6.8 for requirements associated with Delay, Suspension of Work and Extension of time.
- D. Refer to Section III Project Schedule of the Project Controls Manual

1.2 SCHEDULE GLOSSARY

- A. The following terms used in this Section or elsewhere in the Contract Documents shall have these meanings:
 - 1. Acceleration – Occurs when an owner (MBTA) directs a contractor to complete work earlier than the contract substantial completion date (or milestone) or earlier than substantial completion date as modified in accordance with an approved time extension.
 - 2. Activity – An element in the schedule highlighting or depicting a part of the Work and establishing the time and resources required for completing that part of the Work.
 - 3. Artificial Activity Durations – Inflated activity durations in the schedule consume float and influence the critical path.
 - 4. As-Built Schedule- A schedule showing all activities complete including Final Completion.
 - 5. As-Planned Schedule/Baseline Schedule - Construction Schedule Revision 0 (Rev. 0) Submittal returned by the Authority to the Contractor as “Accepted as Submitted” or “Accepted as Noted,” with or without comments or objections noted, showing the contractor’s plan to complete the Work within the Contract Time. As-Planned and Baseline may be used interchangeably and shall have the same meaning.
 - 6. Construction Schedule - Schedule which shows the Contractor’s approach to planning, scheduling, and execution of the Work. Includes the Revision 0 and monthly Progress Schedule Submittal(s).
 - 7. Contract Float - Number of Calendar Days between the Contractor’s anticipated date for early completion of all or part of the Work and the corresponding Contract Time or Contract Milestone(s). Contract Float is further defined as the amount of time any given activity or path of activities may be delayed before it will affect the Contract Time.

8. Cost Loaded Schedule – A CPM schedule which includes the accurate allocation of the cost of the Work to all schedule activities. Costs allocated to each Activity are to be proportional to the scope of the Work of the Activity and consistent with the bid items. The sum of the cost of all schedule Activities is equal to the total Contract Price.
9. CPM - The Critical Path Method of planning and scheduling. References to the Critical Path Method (CPM) shall be to CPM construction industry standards that are consistent with this Section 01322.
10. Critical Path - Any continuous sequence of Activities in the schedule that controls achievement of a corresponding Contract Time or Milestone(s).
11. Data Date- The data up to or through which the project's reporting system has provided actual status and accomplishment. A schedule with a data date of December 1, 2013 shall be referred to as the November 2013 schedule.
12. Days - Refer to Section 00700, Article 1 of the General Conditions.
13. Delays - Slippage of the dates in any Progress Schedule Submittal which forecast any slippage or overrun of Milestone(s) or Contract Times.
14. Disposition – The determined status of the construction schedule submittal after being reviewed by all reviewers for compliance with the Authority's schedule specification. Corrections and/or comments made as part of this submittal review do not relieve contractor of responsibility from conformance with the Contract Documents which has priority over this submittal. The disposition shall be one of the following:
 1. Accepted as Submitted
 2. Accepted with Comments
 3. Not Accepted
 4. For Information Only
 5. Revise and Resubmit
15. Draft Schedule – A working schedule with changes made to the As-Planned Schedule, which has not yet been accepted by the Authority.
16. Early Completion Schedule - A CPM schedule showing completion of the Work ahead of the Contract Time specified in Section 00700, Article 6.2, Prosecution of Work.
17. Early and Late Dates - Early times and late times of performance for the Activities as defined by CPM techniques and as further limited by the requirements of the General Conditions.
18. Fragnet – A fragnet is defined as a sequence of new activities and for activity revisions that are proposed to be added to the existing schedule to demonstrate schedule impact and the method for incorporating changes into the schedule as they are encountered.
19. Milestone - A key event (zero duration) established in the Construction Schedule and as specified in the Contract Documents under Section 00700, Article 6.2.
20. Notice to Proceed (NTP) - The date when the Contract commences.

21. Out of Sequence – When an activity starts or finishes before its predecessor.
22. Preferential Sequencing - Activities that can be performed concurrently and are established in the project schedule as sequential for the purpose of consuming float.
23. Resource Loaded Schedule - A CPM schedule which includes the accurate allocation of the resources to perform the Work, for all schedule activities. Resources allocated to each Activity are to be proportional to the scope of the Work of the Activity.
24. Schedule Meeting - Meeting to review the progress on the Schedule including but not limited to the actual percentage of completion, the actual quantity of resources and number of personnel used, comparing actual dates with the early dates; and the resources/personnel intended to be used for the Look-Ahead Schedule and Recovery Plans as necessary.
25. Schedule Narrative – A descriptive report submitted with each schedule. The required contents of this report are set forth in this scheduling specification, Section 1.8.
26. Schedule Recovery – A schedule that forecasts substantial completion by either the original completion date, or some other date that is earlier than the current projected completion date reflected in the most recent update.
27. Time Impact Analysis (TIA) – Process of quantifying and apportioning the effect of delay or change on a project schedule.
28. Work Day - Any day contract Work is to be performed.

- B. Other terms used in this Section shall have the meanings assigned to them elsewhere in the Contract Documents, and if not assigned and where the context will permit, as used or defined in Massachusetts General Laws (M.G.L.).

1.3

SCHEDULER REQUIREMENTS

- A. The name of the Project Scheduler, together with his/her qualifications, shall be submitted to the Authority for approval. The Project Scheduler shall have a minimum of five [5] years of project CPM scheduling experience, three [3] years of which shall be on projects of similar scope and value of this project. This person shall develop and maintain all aspects of Work on all requirements in this Section as well as all others that relate to planning, scheduling, coordination and reporting of the project status.

1.4

CONSTRUCTION SCHEDULE REQUIREMENTS

- A. The Contractor's approach to prosecution of the Work shall be disclosed to the Authority by submission of the computerized **cost and resource loaded** construction schedule required in this Section. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.
- B. The Contractor is advised that its schedules and reports, as specified herein, will be an integral part of the Authority's management program. The Contractor's schedules will be used by the Authority to monitor project progress, plan the level-of-effort by its own Work forces and consultants, and as a critical decision making tool. Accordingly, the Contractor shall ensure

that it complies fully with the requirements specified herein and that its schedules are both timely and accurate throughout the life of the project. The utilization of secondary schedules (those other than the Baseline Schedule or Progress Schedule Submittals) is prohibited. The Contractor's schedules shall be used by the Authority and Contractor for the following purposes as well as any other purpose where the issue of time is relevant, the Contractor must prepare and plan the CPM with the following considerations:

1. Communicate to the Authority the Contractor's current plan for performing and completing the Work;
 2. Identify scope and paths that are critical to the timely completion of the Work;
 3. Identify upcoming activities on the critical path(s);
 4. Evaluate the best course of action for recovering schedule delays;
 5. Basis of progress payments to the Contractor;
 6. Basis for analyzing the time impact of changes in the Work;
 7. Identify when submittals will be made by the Contractor for the Authority's review;
 8. Aid in prioritizing the Authority's review of submittals;
 9. Document the actual progress of the Work;
 10. Evaluate resource requirements of the Contractor and the Authority;
 11. Aid in integrating the Work with the operational requirements of the Authority;
 12. Facilitate efforts to complete the Work in a timely manner;
 13. Assign responsibility for performing specific activities;
 14. Identify access and availability of Work areas;
 15. Identify interfaces and dependencies with preceding, concurrent, and follow-on contractors; and
 16. Identify lookahead activities.
- C. The construction schedule shall clearly define the prosecution of the Work from Notice to Proceed to final completion by using CPM activities for, but not limited to: submittal preparation, reviews, resubmissions and approval, Milestones, Authority furnished items, material and equipment, interfaces with other contractors, Public Utilities, permitting, testing, deliveries, construction activities, Final Inspection, Certificate of Occupancy, required inspections by Authorities Having Jurisdiction (AHJ), Punch list, substantial completion, final completion, Authority training, and move-in CPM Activities. Logic ties shall be realistic to show the Contractor's Work sequencing and separately define all requisite Authority tasks.
- D. The Contractor has the responsibility to incorporate the Subcontractors and Suppliers input into the schedule for activities, logic ties, etc. involving their Work.
- E. Acceptance of the construction schedule by the Authority shall not relieve the Contractor from compliance with the requirements of the Contract Documents, or result in the approval of any variation from the Contract Documents.
- F. Oracle Primavera Scheduling Software shall be used for all schedules. One license is to be provided to the MBTA Project Office. The contractor may submit to MBTA Project Controls, for approval, a request to use alternative scheduling software compatible with .xer files. The schedule software shall run on Windows platform compatible equipment. The software must also have a demonstrated ability to compare multiple updates (equivalent to Claim Digger). The Contractor shall provide the Authority with certified software training, pay all costs associated with maintenance fees and furnish to the Authority all upgrades and updates acquired from the software vendor during the period allowed for completion of the Work.

- G. The Contractor will submit as part of the Rev. 0 and monthly Progress Schedule Submittal(s) an electronic .xer file containing the complete construction schedule data and files in compliance with the requirements of this Section. Submit electronic files to correspond to the scheduling software mentioned or approved above. Provide the appropriate amount of schedule submittals to the project and one copy to:

MBTA Project Controls
100 Summer Street, Suite 1200
Boston, MA 02110
617-222-5910
projectcontrols@mbta.com

- H. Contractor agrees to:

1. Present to the Authority its scheduling or execution of the Work.
2. Will not utilize schedules different from those submitted to the Authority or any Subcontractor for performance or coordination of the Work.
3. Submit schedules that accurately reflect the intent or reasonable expectations of the Contractor and its Subcontractors.

- I. The Contractor is required to provide a Cost and Resource Loaded Schedule.

1. These project controls tools are to include the accurate allocation of the costs and resources to complete the Work for all schedule activities. Costs allocated to each Activity are to be proportional to the scope of the Work of the activity and consistent with the Contractor's detailed bid. The contractor shall provide written quotes from subs, vendors, suppliers to the Authority upon request. The Authority reserves the right to use the cost-loading as a means to resolve changes and/or claims. Front-loading or other unbalancing of the cost distribution will not be permitted. The sum of the cost of all schedule activities is equal to the total Contract Price. If the cost distribution appears to be unbalanced, the Authority will require written justification as described above prior to accepting the baseline schedule.
2. A CPM schedule includes the accurate allocation of the resources to perform the Work, for all schedule activities. Resources allocated to each Activity are to be proportional to the scope of the Work of the Activity and consistent with the Contractor's detailed bid. The Authority reserves the right to use the Resource Loading as a means to resolve changes and/or claims. Indicating the man-hours per day, by trade and crew, and equipment hour/day is required. The Contractor shall resource load all Schedules to demonstrate the Contractors anticipated crew sizes and that the Contractor's production-based assessments adequately serve as a reasonable plan for the overall Time requirements of the Contract. Durations shall be based on the planned production rates, based on the labor crews, equipment, crew sizes, and materials required to perform each activity. In addition, all change orders will be required to be resource loaded to validate and monitor the duration of the Work to be performed.

- J. Default progress data is not allowed. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software systems.

Actual start and finish dates and remaining duration on the CPM schedule shall match those dates provided from the Contractor back up paperwork (i.e. daily reports, delivery slips, etc.).

- K. The contractor shall only utilize "Retain Logic" (schedule calculation).
- L. The contractor shall not artificially improve its progress by revising schedule logic, relationships, or shortening planned activity durations.
- M. Proposed changes to the As-Planned Schedule/Baseline Schedule, initiated by the Contractor, shall be presented to the Authority as a Draft Schedule for review (see Section 1.11B).
- N. Contractor's failure to substantially comply with this Section shall be a substantial and material breach of contract. In the event the Contractor fails, refuses or neglects to comply with the requirements of this Section 01322, the Authority may elect any of the following: (a) nullify any mobilization payments previously made, (b) stop payments under the monthly partial payment request, (c) prepare alternate progress schedules, as may be suitable under the circumstances, and deduct from the Contract Price all related costs by Change Order, (d) entitle the Authority to the damages afforded for misrepresentation or fraud by these Contract Documents or applicable law. Continued failure of the Contractor to perform in accordance with the requirements of this Section 01322 will be reason to place the Contractor in default of his obligation there under and terminate the Contract.

1.5 USE OF FLOAT

- A. Contract Float is not for the exclusive use or benefit of either the Authority or the Contractor, but must be used in the best interest of completing the project within the Contract Time. If the dates in any Progress Schedule Submittal forecast any slippage or overrun of the Contract Times, the Contractor shall indicate such slippage or overrun by reporting negative Contract Float.
- B. Sequestering of float shall be cause for non-acceptance of the contractor's schedule submittal. In the event that float sequestering is identified, the schedule shall be revised appropriately. The Contractor shall not utilize the following:
 - 1. Float suppression techniques in the Construction Schedule, including but not limited to interim dates imposed by the Contractor other than Contract Time(s) and Contract Milestone(s);
 - 2. Inclusion of activities or constraints in a path or chain leading to a Contract Milestone which are unrelated to the Work as stated and specified in the Contract Documents;
 - 3. Activity durations or sequences deemed by the Authority to be unreasonable in whole or in part;
 - 4. Preferential Sequencing;
 - 5. Artificial Activity Durations; and
 - 6. Misrepresentation of work hours specified in project calendars.
- C. All Contract Time(s) and Milestones shall be imposed, coded and separately identified in all Progress Schedule Submittals in conformance with the Milestone(s) and Contract Time(s) set forth in the Contract Documents. The Contractor shall impose no other date constraints in the construction schedule, unless an explanation of their basis is provided and is acceptable to the Authority.

- D. If the Contractor is delayed in performing the Work, the Contractor shall absorb any related delay, disruption, interference, hindrance, extension or acceleration, however caused, until all Contract Float is consumed. The Contractor shall Work cooperatively with the Authority, adjacent contractors, and third parties, to identify and implement to the maximum extent possible, no-cost measures to recover all schedule delays, regardless of the cause of the delays. One example of such measures is no-cost re-sequencing of Work activities.
- E. Extensions of time for performance of the Work required under the General Conditions pertaining to equitable time adjustment will only be considered to the extent that the equitable time adjustment for activities affected by any condition or event which entitles the Contractor to a time extension, exceed the Contract Float.

1.6 ACTIVITY REQUIREMENTS

- A. Activity durations shall equate to the Work Days required to complete the Work included in each Activity.
1. Activity Durations greater than thirty (30) calendar days should be kept to a minimum, and must be approved by the Authority, except in the case of non-construction activities such as mobilization, procurement of materials, and delivery of equipment. Submittal review activities shall be thirty (30) Calendar Days, unless different review times are specified in other sections of the Contract Documents.
- B. In general, Activities shall be detailed in a manner that utilizes planned durations from one (1) day to thirty (30) Calendar Days, and have a value not exceeding \$50,000. No costs shall be applied to "prepare and submit" and "review and approve" submittal activities. The Authority recognizes that the cost for the early submittal preparation Work is included in the cost of mobilization and shall be billed under that payment item accordingly.
- C. Activities shall be assigned consistent descriptions, identification codes and sort codes. Sort code organization shall: (a) be subject to the Authority's prior consent; (b) group Activities using meaningful organizations defined by Contractor and the Authority; and (c) designate lead responsibility for each Activity. The Contractor shall include specific schedule activity identification codes in its daily field reports when describing the items of Work performed each day.
- D. The total Contract Price shall be allocated to the CPM activities. The cost loaded schedule shall be directly related to the Bid Form and activities defined in the As-Planned schedule. When the schedule is grouped by "Bid item" code, the summary value should be equal to each item in the contract bid form (See Section 1.4 I).
- E. The Work Breakdown Structure shown below shall be utilized to the fullest extent possible.

-Project

-Milestones

-Procurement

-Prepare & Submit

-Review & Approve

-Fabrication

-Construction

-Phase/Location/Area

-Preconstruction

-Construction Activities

-Inspections/Certification

-Closeout

- F. Activities shall be sufficiently detailed to separate items of Unit Price Work from lump sum Work, breakout distinct classes of Work (e.g. CSI Divisions/Sections or equivalent) and Work in separate areas or locations, as specified by the Authority. Work being performed by DBE firms shall be identified as separate CPM activities.
- G. Activity Code – The Schedule shall include but not be limited to the following activity codes:
1. Bid item
 2. Submittal
 3. Review/approval
 4. Procurement/fabrication
 5. Delivery
 6. Construction/installation
 7. Change order
 8. Milestone
 9. Responsibility
 10. Areas
 11. Construction phase
- All notices of non-conformance shall be included as a separate activity code
- H. Activities shall be broken down to a sufficient level of detail to avoid the use of lag. The Contractor shall seek approval and provide justification for the use of logic 'lags.' 'Negative lags' are not allowed.

1.7 SCHEDULES/REPORTS/PLOTS

- A. Activity Reports shall include Activity ID, description, duration, calendar, Early Dates, Actual Dates, and Late Dates, Total Float and sort codes as specified by the Authority. The Late Finish Date of any Activity representing a Milestone shall equal the corresponding Contract Time. In addition, Activity reports shall show, for each Activity, all preceding and succeeding driving logic ties or attach a separate report combining such Activity and logic tie data.
- B. Bid Item Report shall include Activity ID, description, duration, early dates, total float, budgeted cost, physical % completed and actual cost this period. The Contractor shall follow the Authority's Sample Bid Item Report and Procedures document. A copy may be requested by contractors through MBTA Project Controls. (See "Construction Schedule/Pay Requisition Approval Process Flowchart", Exhibit D in the MBTA Project Controls Manual 10.16.14 Rev. 4).
- C. Resource Report shall include monthly and cumulative crew hour performance curves for its own forces and subcontractors, as designated by the Authority with all schedule submissions. These performance curves shall be based on current Early Dates and Late Dates and, when requested by the Authority, shall compare As-Planned Early Dates and current Early Dates. The Contractor shall also resource load its planned equipment for all activities.

The Contractor shall prepare a crew hour analysis in the form of a series of graphic displays depicting manpower by principal trades in the aggregate, and in accordance with the schedule. The graphs shall display the number of crew-days of effort, for each month, over the life of the

project. This submission shall be computerized and shall correlate with the labor data, exported from the Scheduling software and shall be submitted with the baseline and change orders.

- D. Cash Flow Report shall be developed using the cost assigned to each activity of the Schedule and a monthly cash flow projection, illustrated by exporting the scheduling data in graphic display or tabular form. Both shall demonstrate the estimated cash drawdown in the aggregate, by month, over the life of the project. Additionally, the data shall be organized/sortable by Activity. Redistribution of budgeted costs is prohibited after the complete Rev. 0 baseline has been returned "accepted or accepted as noted".
- E. Look-Ahead Report shall display the activities planned at the closing (i.e. data, cut-off) date that cover the previous two (2) weeks and the next four (4) weeks. The utilization of look-ahead or look-back schedules that do not directly utilize the same activity coding within the baseline schedule and subsequent progress schedules, is prohibited. The Look Ahead Report shall be submitted for each progress meeting.

If any of the required schedule submissions, in this Section, are returned to the Contractor for corrections or revisions, they shall be resubmitted, along with an electronic file, for acceptance within ten (10) calendar days after the return.

1.8 NARRATIVES

The Schedule Narrative is a component of the schedule submittal. Each narrative shall list the Activities on each Critical Path and compare Early Dates and Late Dates for Activities designating Contract Times.

The Schedule Narrative shall communicate to the Authority the Contractor's progress and plan for performing and completing the Work.

A. Baseline narrative shall include details regarding:

1. The use of construction equipment and resources
2. Basis and assumptions for activity durations and logic
3. Compliance with winter weather requirements and adverse weather
4. Any shifts non-Work days and multiple calendars applied to the activities
5. Financial periods as related to progress and payments
6. Identify activity Work items and paths that are critical to the timely completion of the Work
7. Critical submittals by the Contractor for the Authority's review
8. Plan and approach to sequencing of the Work
9. All labor and equipment resources shall be defined according to each crew by trade
10. Glossary of Terms, Schedule Coding, and Abbreviations used in the Contract Schedule.
11. Calendar
12. Budgeted Cost

B. Progress Schedule Submittal Narrative shall include details regarding:

1. Identify activity Work items and paths that are critical to the timely completion of the Work
2. Explanation of Work that couldn't be performed in the previous period
3. Critical submittals by the Contractor for the Authority's review

4. Any potential/future/pending changes in access to or availability of Work areas
5. Upcoming phased or total takeover by Authority. Overview of progress and changes since the last submittal and discussion of potential and actual delays
6. Changes in activities
7. Calendar
8. Logic
9. Cost this period
10. Remaining cost
11. Cost to date

C. TIA/Recovery Narrative shall include details regarding:

1. Proposed course of action for recovering any schedule delays
2. Any significant change to resources for completed, current, and forecasted Work
3. Plan and approach to sequencing of the Work
4. Calendar
5. Logic
6. Recovery Plan
7. Contractor Initiated Revisions

D. Each narrative shall certify that the Contractor has not been delayed, as of the closing date, by any act, error or omission of the Authority, except as otherwise specifically stated in the narrative or identified in a claim submitted in accordance with the General Conditions of the Contract. If the Contractor fails to comply, then any determination made by the Authority will be binding on the Contractor.

1.9 ADVERSE WEATHER PLANNING

- A.** The schedule submittal to the Authority must include planning for adverse weather if applicable. Planning for adverse weather is the strategy used to develop a schedule that produces reasonable and historically consistent early start dates. If applicable, it is reasonable to conclude that adverse weather conditions will be expected for a specific project in a specific location during a specific time frame.
- B.** The Contractor must provide the Authority evidence of excessive weather conditions from NOAA (National Oceanic Atmospheric Administration) in order to utilize the days allocated for adverse weather.
- C.** Weather events consist of rain in excess of 0.5"/day or snow of 0.5"/hr. occurring within the Work hours and affects specific weather sensitive activities that forces shut down of 50% or more of the project, the workday, or personnel. Weather sensitive activities shall be reflected within the schedule with the appropriate weather calendar assignment.

- D. The Contractor's project schedule must reflect the following non-work days due to adverse weather.

NUMBER OF ANTICIPATED ADVERSE WEATHER DAYS PER MONTH

<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>
7	5	2	1	0	0
<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
0	0	1	1	1	3

- E. Time Extension for unusually severe weather:

1. This provision specifies the requirements for the consideration of time extensions for unusually severe weather. In order for the Authority to grant a time extension, the following conditions must be satisfied.
 - a. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month as discussed in 1.9.C.
 - b. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.
2. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall record on the daily activity logs, the occurrence of adverse weather and resultant impact to normally scheduled Work. Actual adverse weather delay days must prevent Work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph 1.9.D, the Authority will convert any qualifying delays to calendar days and issue a modification.
3. Determination will be based on the TIA section.

1.10 CONSTRUCTION BASELINE SCHEDULE SUBMITTAL

- A. The **Initial Schedule** (90 Day) Submittal shall be due within ten (10) Days after receipt of the Notice to Proceed, and shall include the Contractor's detailed plan, with all schedule requirements contained in this Section with at least the first three (3) months of the forthcoming complete baseline. This schedule shall be cost and resource loaded and shall identify activities to be completed and associated budgeted amounts for the first three (3) months.
- B. The **Baseline** Schedule (fully cost and resource loaded) shall be due within 45 days from NTP.

The Baseline Schedule shall reflect the Work as awarded and shall purposely exclude any Delays, Change Orders, "or equal" materials, equipment and substitutions of any kind. Additionally, the Contractor is to ensure that the schedule submission is in complete conformance with the intent of the Contract Documents. No proposed alternates will be accepted until presented to the Authority after the full Baseline Schedule has been accepted. After acceptance of the Baseline Schedule, redistribution of costs is prohibited.

- C. Each Schedule Submittal shall include an electronic file with the Contractor's schedule data files (including activity data, logic, coding, resource and cost data), a narrative and four (4) copies of the specified Activity Reports, Bid Item Report, Cash Flow Plots, Resource Plots, Look Ahead Schedule as defined in paragraph 1.7, all in formats, sorts and sequences acceptable to the Authority.
- D. The first partial payment shall not be made until the Authority returns to the Contractor the Initial Schedule (90 Day) as "Accepted as Submitted" or "Accepted as Noted". The first partial payment is limited to costs associated with mobilization, third party utility, insurance and bond. Payment associated with mobilization shall be limited to 2% of the total contract value less the value of allowance items. Half of the mobilization schedule activity cost (1%) is applied to the first partial payment.

The second partial payment shall be limited to pro-rated CPM schedule costs and the remaining half of mobilization (1%), and shall be made after the Baseline Schedule is returned "Accepted as Submitted" or "Accepted as Noted."
- E. Once the Baseline Schedule is returned to the Contractor as "Accepted as Submitted" or "Accepted as Noted", it shall become the *As-Planned* Schedule of record. Once established, the *As-Planned* Schedule shall be used as the basis for Monthly Schedule Submittals.
- F. The Construction Baseline Schedule shall incorporate the Contractor's best estimate of the Activities and logic ties required to perform the Work within the limits of the Contract Times.
- G. The Contractor shall uniquely identify the Baseline Schedule Submittal by using the filename nomenclature, as shown in the Project Controls Manual Exhibit E.

1.11 MONTHLY PROGRESS SCHEDULE

The Monthly Progress Schedule shall be reviewed by the Authority to determine disposition.

The Contractor shall uniquely identify the Monthly Progress Schedule Submittal by using the filename nomenclature, as shown in the Project Controls Manual Exhibit E.

A. PROGRESS SCHEDULE SUBMITTAL

- 1. The Progress Schedule is limited to the following:
 - a. Actual start dates;
 - b. Remaining duration values;
 - c. Actual completion dates;
 - d. Actual cost this period;
 - e. Activity physical percent completion value; and
 - f. Out of Sequence for current updated period.

2. Monthly Progress schedules are required as a prerequisite to processing each partial payment starting with the third and subsequent payment requisitions. The schedule shall be limited to progress up to the closing date of each month.
3. The Authority and Contractor shall utilize the accepted Progress Schedule to monitor progress against the baseline.
4. In the event issues, changes, or re-sequencing of work is required, the Contractor shall prepare a draft schedule as described in Section 1.11 B.
5. If the Contractor fails to fully resolve all the Authority's review comments and objects to the satisfaction of the Authority within sixty (60) calendar days from the date of the disposition, the Authority shall withhold further progress payments.
6. The Bid Item Report is required to be submitted with a Progress Schedule Submittal.
7. Disposition for the progress schedules as defined by the Authority is one of the following:
 - a. Accepted as Submitted
 - b. Accepted with Comments
 - c. Not Accepted
 - d. For Information Only
 - e. Revise and Resubmit

B. DRAFT SCHEDULE SUBMITTAL

1. All changes that occurred from the previously accepted Monthly Progress Schedule, and not currently submitted to the Authority for acceptance shall be recorded only on the Draft Schedule submittal.
2. The Draft Schedule submittal shall incorporate all proposed activity and logic revisions required to accomplish the following:
 - a. Implement changes in the Work;
 - b. Detail all impacts on pre-existing Activities;
 - c. Show Recovery Schedule;
 - d. Reflect the Contractor's proposed approach for remaining Work;
 - e. Incorporate substitution proposals; and
 - f. Potential Change Orders, RFI's and Non-conformance.
3. Other types of changes to the Project Schedule may include, but not limited to the following:
 - a. Added/Deleted activities;
 - b. Original Duration changes;
 - c. Change Order values;
 - d. Assigned resources; and
 - e. Assigned calendars.
4. The Contractor shall submit a Draft Schedule and Narrative to the Authority and the Consultant in order to review the proposed changes to the remaining work. The Authority will schedule a workshop to discuss at a minimum: the impacts, recovery plan, change order schedules (fragnets), plan vs. current performance, manpower, etc. The required attendance for the Draft Schedule Workshop is as follows:

- a. Project managers (Authority and Contractor);
 - b. Resident Engineer (Authority);
 - c. Schedulers (Consultant, Authority, and Contractor);
 - d. Owner's Representative, if applicable; and
 - e. Key Subcontractors, as determined by the Authority.
5. The review of the Draft Schedule Submittal by the Authority does not assess ownership of delays. A separate Time Impact Analysis (TIA) shall be submitted as specified in Section 1.11 D to identify ownership of delays.
 6. The accepted Draft Schedule Submittal shall become the new As-Planned Schedule for future monthly progress schedule.

C. SCHEDULE RECOVERY

Should the progress fall behind the contractual milestones for reasons other than those that are excusable within the terms of the contract, the Contractor shall implement a plan to recover the schedule. The plan must detail how impact will be mitigated through the use of activity re-sequencing, adding additional crews, longer work hours, extra work days, etc., at no cost to the Authority.

D. TIME IMPACT ANALYSIS SUBMITTAL

Any Contractor request for adjustment in Contract Time and Contract Price will not be evaluated unless (a) the Contractor, using the procedures in this Section and the Contract, shows that conditions justifying adjustments in Contract Time and/or Contract Price have arisen, and (b) the Contractor's analysis is verifiable through an independent review of the Time Impact Analysis (TIA) by the Authority.

Determination and extension of the Contract Time will be in accordance with Section 00700 Article 6.8. In order for the impact to be considered, the Contractor shall demonstrate that the critical path was adversely affected.

1. The Contractor shall submit to the Authority a TIA illustrating the influence of each change or impact to the current contractual Milestones.
2. Each TIA shall include a 'fragnet' demonstrating how the change issue or event impacts the last accepted Progress Schedule Update and critical path. This fragnet shall be resource loaded.
3. A meeting between the contractor, Authority project staff, and MBTA Project Controls shall be held to thoroughly review, analyze, and resolve each alleged impact.
4. The TIA shall include:
 - a. A detailed narrative which clearly describes the events causing the impact;
 - b. Documentation substantiating and supporting the impact;
 - c. Detailed CPM Schedules (both electronic and hard copies) clearly delineating the impact to the critical path;
 - d. A matrix showing impacts caused by any third party and any force majeure; and

- e. Any additional information reasonably requested by the Authority that is needed to perform the review of the Contractor submitted TIA.
- 5. The extension of Contract Time shall be considered only if the Contractor is able to demonstrate merit of the impact to the critical path using Window Analysis Methodology (as defined in AACE Recommended Practices #29R-03, Forensic Schedule Analysis), or other similar methodology acceptable to the Authority.
- 6. The Contractor's failure, refusal or neglect to comply with the requirements specified in this Section shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence. If faced with such a situation, the Authority may:
 - a. Direct alternate schedule recovery - if in the judgment of the Authority it appears that the Contractor cannot complete his Work within the scheduled time, then the Contractor shall Work overtime, additional shifts or adopt such other procedures as may be necessary to restore adherence to the schedule. The full cost of any such recovery - Work efforts shall be borne by the Contractor, and/or
 - b. The Authority can withhold liquidated damages, as provided in Section 00700 Article 6.9.

E. SCHEDULE ACCELERATION

Acceleration occurs when an owner (MBTA) directs a contractor to complete work earlier than a contractual milestone date or as modified in accordance with an approved time extension (See Section 1.11 D). The Contractor shall adhere to the following procedure.

Ten (10) business days prior to negotiations with the Authority, the Contractor shall provide a schedule for acceleration of remaining work and all supporting documents including, but not limited to the following:

- a. Identify activities to be accelerated
- b. Identify proposed calendar(s)
- c. Identify proposed crew(s)
- d. Identify proposed duration changes
- e. Identify proposed logic changes
- f. Provide narrative with basis of assumption
- g. Identify cost for acceleration

G. MEETINGS

- 1. Schedule Planning Session - Within fifteen (15) days after Contract award, and prior to submission of the baseline construction schedule, the Contractor shall attend a schedule planning session. At the meeting the Authority shall discuss procedures associated with schedule and costs as described in the Project Controls Manual, Exhibit A, Contractor Schedule Submittal Review Workflow; Exhibit B, Schedule Planning Session; Exhibit C, Uniform Schedule (P6) Settings for MBTA Projects; Exhibit D, Construction Schedules/Pay Requisition Approval Process Flow Chart; and Exhibit E, Filename Nomenclature. This session will also be attended by the Authority and its consultants. The Contractor shall anticipate requiring the attendance of key members of the Contractor's project team including the Contractor's scheduler. During this session, the Contractor shall present its planned approach to the project:

- a. The planned construction sequence and phasing; identify Work self-performed and sub-contracted;
- b. A listing of all key submittals with an initial priority rating for each of them;
- c. Estimated durations of major work activities;
- d. The anticipated critical path of the project; and
- e. A summary of the most difficult schedule challenges the Contractor is anticipating and how it plans to manage and control those challenges.

This will be an interactive session, and the Contractor shall answer all questions that the Authority and its Consultants may have. The Engineer shall provide copies of a written summary of the information presented and discussed during the session to the attendees. The Contractor's initial Construction Schedule Revision 0 and accompanying Schedule Narrative shall incorporate the information discussed at this schedule planning session.

2. Schedule/Pay Requisition Meeting – A meeting will be required and held monthly by the contractor, the consultant, and MBTA Field Staff to discuss and agree on monthly schedule progress. The Contractor shall anticipate that key members of the Contractor staff including but not limited to the Project Manager, the Site Supervisor, the Construction Scheduler and a representative of the key sub-contractors (as determined by the Engineer), shall attend each of these meetings. This meeting is to be separate from the Job Progress Meeting, and separate from the Work-Off List Meeting.
3. Work-Off Meeting (and Work-Off List) – A series of meetings in which representatives from the Authority, the Contractor (consisting of no less than the Project Manager, the Site Supervisor, the Office Engineer, and the Construction Scheduler), every key sub contractor (as determined by the Authority), and the Authority's Designer of Record are present to review the specific details of the Work that remains to be completed, the interdependencies within each area and crew, the remaining approvals and inspections, the requirements to obtain certificate of occupancy, and the detailed status of each Work activity and sub-Work activity. The Contractor is responsible to prepare and maintain the Work-off list consisting of detailed schedule activity data, with the same activity coding that is in the Baseline Schedule and the subsequent Progress Schedule updates. Meetings shall be held at the following intervals:
 - a. 4 to 2 months prior to station opening and/or project substantial completion – Work-off meetings will occur once a week;
 - b. 2 to 1 month prior to the station opening and/or project substantial completion – 2 times per week;
 - c. 1 month prior to the station opening and/or project substantial completion – 3 times per week.
 - d. Work-off Meetings are required when projects are four (4) months from a major Milestone, opening or Substantial Completion.

1.12 MEASUREMENT AND PAYMENT

A. MEASUREMENT

1. Separate Measurement will not be made for the Work of this Section complete in place, but all costs, therefore, shall be included in the Contract Lump Sum Price for the Work as indicated herein. All preparation and incidental Work necessary to accomplish the installation will be considered incidental to the Lump Sum price.

B. PAYMENT

1. Fifteen percent (15%) of the cost associated with the CPM Scheduling Activity will be made upon return to the Contractor of the complete cost and resource loaded CPM Construction Schedule Rev.0 Submittal as "Resubmittal Not Required" (As-Planned Schedule). This shall be included in the Contract's Lump Sum breakdown as an Activity within the CPM schedule.
2. The remaining (85%) will be pro-rated in equal amounts on each subsequent application for payment upon the Authority's receipt and approval of the monthly CPM updates. The number of months to be used for the pro-rating will be the number of months estimated to complete the Work as defined under Article 6.2 – Prosecution of Work. The final month pro-rated amount will not be made until the final application of payment.
3. All payments are subject to retainage.
4. The final payment may be released to the Contractor when the As-Built is submitted to the Authority for review and receives a disposition of "Accepted As Submitted".

C. PAYMENT ITEM

Item No.	Description	Unit
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 01331

CHAMP MANAGEMENT SYSTEM REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies CHAMP, a software application that is specifically designed to monitor conformity with State and Federal affirmative action and Disadvantaged Business Enterprise (DBE) laws and regulations (see Appendices No.1, 2, and 3). The Authority expects this software to support the administration of Executive Order 11246, 390 and Bill 2142, EEO Requirements and Disadvantaged Business Enterprise Utilization Requirements more efficiently and effectively than typical manual methods. The use of CHAMP will eliminate the need for manual production of weekly work hour reports, DBE Payment forms and annual contractor workforce reports.

1.2 EQUIPMENT

- A. The specified management system is comprised of software products marketed under the trademark CHAMP by Washington and Rice, LLC, 27629 Chagrin Blvd., Suite 201, Woodmere, Ohio, 44122, 216-591-9130. The contractor shall obtain this software from Washington and Rice, LLC.

1.3 DETAILS

- A. The contractor shall import text files of CHAMP compatible payroll data into the CHAMP software. The contractor and all approved subcontractors shall create these payroll files via an export from their computerized company payroll systems and/or manual data entry. After award of the contract and prior to notice to proceed, the contractor shall, if necessary, purchase CHAMP software and arrange for technical support and training from the indicated sources as follows.
1. Washington and Rice LLC.
 2. The Contractor shall purchase one copy of the CHAMP Contractor Module (CM) to support the contractor's import of contractor and subcontractor payroll data, compliance monitoring and creation of required CHAMP reports.
 3. The Contractor shall purchase a copy (ies) of the CHAMP Subcontractor Module(SM) to support manual entry of payroll data by its subcontractor (s) in instances where a subcontractor (s) does not own CHAMP and cannot create compatible import files from their company payroll system.
 4. The Contractor shall obtain file specifications for the payroll import file.
 5. The Contractor shall obtain technical advice and assistance regarding software, installation and operation.
 6. The Contractor shall obtain CHAMP training from an Authority approved vendor.

1.4 BASIS OF ACCEPTABILITY:

- A.** For the duration of the contract, the contractor shall. :The Contractor shall keep the CHAMP software updated with contractor and subcontractor data;
- B.** The Contractor shall provide a diskette containing the exported contract file and hard copies of required reports in accordance with established submittal procedures, and;
- C.** The Contractor shall install vendors issued upgrades and maintain the software to ensure data submissions are made using the most recent version of the software.
- D.** The contractor shall bear all costs associated with the purchase of all hardware, software and training associated with the CHAMP Management Program.
- E.** The contractor or its subcontractors shall not re-sell any module of the CHAMP Management Program

1.5 SYSTEM FEATURES

- A.** Champ-CM provides the following features:

- 1. Work Force Utilization**

- a. Establish goals for project by race, gender, and craft
 - b. Automatic assignment of work force hours to projects
 - c. Import work hours capability
 - d. Graphic display of work hours actual versus goals

- 2. On-Job-Training (OJT)**

- a. Establishes OJT Plan for projects
 - b. Track Hours for Apprentices and trainees
 - c. Presents OJT graphic information

- 3. DBE Monitoring**

- a. Establishes DBE goals for project
 - b. Tracks payments to Prime & DBE's.

- 4. Reporting**

- a. Generates monthly utilization reports
 - b. Generates form 1391
 - c. Work Force information
 - d. DBE summary
 - e. Work Force listings.

1.6 MINIMUM SYSTEM REQUIREMENTS

- A.** Computer and related components

1. A 486DX computer or higher
2. 8 Megabytes or more of memory
3. 128 Cache memory
4. 1 megabyte VRAM
5. PC-DOS or MS-DOS version 3.3 or higher
6. Microsoft Windows 3.1 or higher
7. A 3.5" high density disk drive
8. 25 MB hard disk space for the deployment DLLs, Database, BD files, ODBC and EXE
9. VGA display
10. Windows supported mouse

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section specifies the general requirements for quality assurance and quality control including source of supply and quality of materials, acceptance testing by the Engineer, control testing by the Contractor, off-site inspection, inspection and use of local materials, inspection of proportioning plants and coordination of finishes.
- B. Quality Assurance Program: The Contractor is responsible for controlling the quality of Work including work of its Subcontractors and suppliers and for assuring that the specified quality is achieved. The Contractor, Subcontractors and suppliers shall establish, maintain and implement a written Quality Assurance Program meeting the requirements of U. S. Department of Transportation Quality Assurance and Quality Control Guidelines (FTA-MA-06-0189-92-1). The Program shall be tailored to the scope and complexity of the Work and shall include implementing procedures and inspection forms equal to those included at the end of this Section. Subcontractors or suppliers may use the Contractor Quality Assurance Program in lieu of developing their own.
- C. The overall administration of the Quality Program shall be vested in a responsible section of the Contractor's organization. This section shall contain a QC Organization headed by an on-site QC Manager who has clear access to top-level management and to Subcontractors' officers responsible for the execution of the Subcontractor's QC Program. The QC Manager's sole duty is to manage and administer the QC Program unless otherwise authorized in writing by the Engineer. Such authorization can be withdrawn at any time. The QC Manager shall have at least five (5) years experience in quality control inspection on construction projects.
- D. The QC Organization shall be staffed by technically competent personnel with freedom to make decisions without pressure or bias and shall have sufficient authority to ensure that quality requirements are consistently maintained.

1.2 SUBMITTALS

- A. The Contractor shall submit within three weeks of the Notice to Proceed the Quality Assurance Program to be used on the project by the Contractor and Subcontractors. The resume of the Contractor's Quality Control Manager shall be included with the submittal. Changes to the Quality Assurance Program shall be submitted for approval prior to implementing the changes.
- B. The Contractor shall submit the name, address, and qualifications, together with the scope of proposed services, of proposed inspection or testing firms to the Engineer for approval at least 30 days prior to the scheduled commencement of any work involving such inspection or testing.
- C. Test Reports - Within five days after completion of testing performed by or for the Contractor, submit test results to the Engineer. The Contractor shall identify the test reports to be submitted as required in Section 01300. Test reports shall be identified with the information specified for samples in Section 01300 and additionally, the name and address of the organization performing the test, the date of the tests and a signature of an authorized representative attesting to the validity of the test results.

1.3 DELIVERY, STORAGE, AND HANDLING (Not Applicable)

1.4 QUALITY ASSURANCE

A. Source of Supply and Quality

1. If the Engineer so desires, materials will be approved at the source of supply before delivery.
2. Unless otherwise stipulated the Contractor shall furnish all materials required for the Work specified in the Contract, and said materials shall meet the requirements of the Specifications for the kind of Work involving their use.
3. Unless otherwise provided, only new and first quality materials conforming to the requirements of the Specifications and approved by the Engineer shall be used in the work, except for material used by the Contractor for his convenience and which is not to be permanently incorporated in the work.
4. After testing if the sources of supply that have been approved do not furnish a uniform product or if the product from such sources proves unacceptable at any time, the Contractor shall, at no additional expense to the Authority, take any and all steps necessary to furnish acceptable materials.
5. Materials such as crushed stone, gravel borrow, or ordinary borrow, shall be sampled at the source and, if satisfactory, given preliminary approval for use. Samples shall be taken by or in the presence of the Engineer. The Contractor shall furnish such facilities as the Engineer may require for collecting and forwarding samples to the Authority Laboratory. Samples shall be furnished without charge and with any shipping charges prepaid. However, preliminary approval by the Engineer does not relieve the Contractor of the responsibility for placing satisfactory material in the Work as determined by subsequent samples taken at the source or on the Contractor site, prior to the material being incorporated into the Work and if the Contractor site samples test satisfactorily the material will be considered to meet the Contract requirements as to quality. If such sampling and testing reveal that the material is unsatisfactory it shall be removed from the Work or blended in with such other materials so that an acceptable material will be produced. Removal and blending of such material shall be done by the Contractor without additional compensation.

B. Rights of Access

The Engineer may make visits at the proportioning plant or source of supply to audit or inspect the production of material, or the manufacture of products. These visits, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer or manufacturer. The Contractor shall assure that "Rights of Access" clauses are contained in the purchase document with the producers of materials or manufacturers of products allowing the Engineer, or an authorized representative, to have free entry at all times to such parts of the off-site plant concerned with the manufacture or production of the materials. Adequate work facilities at the off-site plant, shall be furnished free of charge to the Authority for its use during audits or inspections. The Engineer assumes no obligation to inspect materials at the source of supply. The responsibility of incorporating satisfactory materials in the Work rests entirely with the Contractor, notwithstanding any prior inspections or tests.

C. Acceptance Testing

1. Acceptance testing is the testing of materials and workmanship by the Engineer for acceptance of the completed Work. The Engineer will perform acceptance testing of materials and workmanship in accordance with the Contract Documents and reserves the

right to perform additional testing at any time to determine conformance with the Contract requirements.

2. Acceptance testing by the Engineer is not to be considered a replacement for control testing conducted by the Contractor or a manufacturer producing materials for the Contract. Acceptance testing will be at the expense of the Authority.

D. Hold and Notification Points

The Contractor will be required to notify the Engineer when certain activities will be performed. These notifications and time requirements will be detailed in the various sections of the Specification. There will be two types of notifications as follows:

Hold Point - A point in a function or process in which the Engineer performs a planned inspection and beyond which work may not proceed without prior approval from the Engineer.

Notification Point - A point in a function or process in which the Engineer may perform an inspection. The Engineer must be notified at this point and work may proceed.

Failure to provide sufficient notice to the Engineer or violating a "Hold Point" may result in the subsequent rejection of the work. Any correction of the work will be at the expense of the Contractor.

E. Control Inspection and Testing

1. Control inspection and testing are the testing or inspection of materials prior to their delivery from a manufacturer, or during construction. Examples of such testing are soils tests before and after compaction, concrete tests during placement, except for concrete strength tests that the Engineer will perform, and other tests and inspections specified in the various sections of the Specifications to ensure compliance with Contract requirements. The Contractor shall assume full responsibility for control inspection and testing and give sufficient notice to the Engineer to permit the witnessing of the inspections or tests. Control inspection and testing shall be at the expense of the Contractor and may be performed by independent firms.

Notification Point - The QC Manager shall make periodic site inspections of the work areas with the construction supervisors to assure that there are no conditions that would affect the quality of the installation or product. Deficient areas shall be identified, causes identified and deficient conditions corrected. Inspections shall be documented on the "General Inspection Form" contained at the end of this Section. The Contractor shall notify the Engineer in advance of the periodic inspections to allow participation by the Authority.

F. Coordination of Finishes

1. Within a reasonable time after Award of Contract, and unless otherwise included in the Contract Drawings the Engineer will provide a color coordination schedule designating colors and textures of finish materials in areas where required.
2. It is the intent of the Contract Documents to produce harmony of matching finish, texture, and color throughout various components of the Project.
3. Work coordination of like materials to achieve the above-mentioned intent is required by submitting to the Engineer for approval pilot samples of acceptable ranges of color variation and of finish textures. Coordination is especially required for concrete surfaces: metals including anodized aluminum; glass; sealants; hardware; floor, wall and ceiling coverings; painted surfaces; equipment items; and paving of dry nature.

4. Upon obtaining the Engineer's acceptance of any range of colors and textures, furnish the Engineer with one record set of samples, or more if required, and keep sufficient sets for use in coordinating conformity with this record set.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

SECTION CONTINUED ON THE FOLLOWING PAGES



HIGH STRENGTH BOLTING CHECKLIST ROTATIONAL CAPACITY TEST

DATE: _____

DATE OF TEST _____

CONTRACTOR _____

CONTRACT NO. R20CN01 _____

PAY ACTIVITY _____

SUBMITTAL _____

TEST NO. _____

ITEM TESTED

SIZE AND DESCRIPTION	MFG.	MARKING	LOT NO.	FINISH
BOLT				
NUT				
WASHER				

ROTATIONAL CAPACITY LOT NUMBER: _____

TEST RESULTS

	RESULT TEST 1	RESULT TEST 2	PASS		FAIL	
MINIMUM TENSION REQUIRED						
TORQUE AT MINIMUM TENSION						
TENSION AFTER FULL ROTATION						

COMPUTED TORQUE VALUE: _____

TEST WAS CONDUCTED USING: ☐ SKIDMORE ☐ SOLID PLATE SERIAL NO.: _____ CAL. DATE: _____

TORQUE WRENCH USED: SERIAL NO.: _____ CALIBRATION DATE: _____

DEGREE OF ROTATION: _____

REMARKS: _____

☐ RCL TEST SHEETS FOR ALTERNATE DESIGNED FASTENER WILL BE FURNISHED UPON REQUEST

CONTRACTOR REPRESENTATIVE _____

DATE _____

MBTA _____

DATE _____

R20CN01
2015

QUALITY ASSURANCE
01400-5

CONFORMED SET
Work Platforms for Riverside Carhouse



CONCRETE PLACEMENT CARD

DATE:

CONTRACTOR:

CONTRACT NO. R20CN01

CONCRETE PLACEMENT NO:

SCHEDULED PLACEMENT DATE:

STRUCTURE

ELEVATION: FROM TO

ACTUAL PLACEMENT DATE:

TIME:

START:

FINISH:

TYPE MIX:

ESTIMATED QUANTITY-CY

ACTUAL

PLACEMENT FOREMAN:

MBTA INSPECTOR

CONTRACT DOCUMENTS:

REMARKS:

PREPLACEMENT CHECKS

ITEM	CONTRACTOR INSPECTOR	MBTA INSPECTOR	REMARKS
EXCAVATE AND SUBGRADE			
FORMS – LINE AND GRADE			
FORMS – BRACED, READY TO POUR			
RE-STEEL - QUANTITY/LOCATION/TYPE			
RE-STEEL - SECURE AND CLEAN			
WATER STOPS/SEALS, JOINT PREP.			
PIPE – QUANTITY-SECURE-ELEV.			
ELEC. CONDUIT-QTY-SECURE-ELEV.			
GROUND WIRE			
ANCHOR BOLTS & RODS/EMBED ITEMS			
FORMS HEATED IN COLD WEATHER			
COLD WEATHER CURING PRECAUTIONS			
CLEAN-UP INSIDE FORMS			
METHODS OF CURING			
SLURRY			
GUIDE WALLS IN TOLERANCE			
BENTONITE SLURRY TESTING			
OTHER (IDENTIFY)			
O.K. TO PLACE CONCRETE		MBTA INSP.	DATE:



EXPANSION/EPOXY* EMBEDDED ANCHORS INSTALLATION AND INSPECTION REPORT

DATE: _____

CONTRACT NO. R20CN01

CONTRACTOR: _____

ATTACHMENT LOCATION: _____

DRAWING/REV.: _____

SUBMITTAL: _____

PAY ACTIVITY: _____

TYPE, SIZE, NUMBER OF ANCHORS: _____

PREPLACEMENT CHECKS

INSPECTOR CHECKPOINTS	CONTRACTOR	DATE	MBTA	DATE
CONCRETE SURFACE				
ANCHOR HOLE LOCATION SURVEY AND MARKED				
EPOXY INJECTION SATISFACTORY*				
TEMPERATURE RANGE SATISFACTORY				
TORQUE TEST				
ANCHORS INSTALLED CORRECTLY				

TEST WRENCH
ID: _____

CALIBRATION DUE DATE: _____

REMARKS:

****Use of adhesive anchors in either overhead or sidewall applications are prohibited without prior approval by MBTA Chief Engineer for Design and Construction***

FIELD COATING INSPECTION REPORT

DATE: _____

CONTRACT NO. R20CN01

CONTRACTOR:

LOCATION:

ITEM DESCRIPTION.:

COATING DATE:

1ST 2ND 3RD ☐

AREA INSPECTED:

DRAWING/REV.:

PAY ACTIVITY:

INSPECTIONS	CONTRACTOR	DATE	MBTA	DATE
SHELF LIFE/STORAGE TEMPS NOT EXCEEDED; UNOPENED ORIGINAL CONTAINERS WITH LABELS. BATCH NUMBER_____				
SURFACES TO BE COATED ARE CLEANED OF OIL, GREASE AND OTHER DETRIMENTAL MATERIAL				
TOUCH UP BARE OR ABRADED SURFACES WITH APPROVED COATING				
FIELD CONNECTIONS (WELD, BOLTING) SURFACES CLEANED AND PROFILED PRIOR TO PRIMER				
MATERIALS MIXED AND PREPARED TO MANUFACTURER'S RECOMMENDATIONS				
APPLICATION TO MANUFACTURER'S SPECIFICATIONS				
CURE TIME ACHIEVED PRIOR TO COATING				
COLOR AS SPECIFIED				
COATING THICKNESS (DFT) REQUIRED ACTUAL _____				
ENVIRONMENTAL RECORD SURFACE TEMP _____ HUMIDITY _____ AMBIENT DEW TEMP _____ POINT _____ SURFACE CONDITIONS _____ WEATHER CONDITIONS _____				
REMARKS:				



GROUTING INSPECTION REPORT

DATE: _____

CONTRACT NO. R20CN01

CONTRACTOR: _____

LOCATION: _____

DRAWING/REV.: _____

SUBMITTAL: _____

SUBMITTAL: _____

DESCRIPTION OF _____

GROUT TYPE/ID: _____

PAY ACTIVITY: _____

INSPECTIONS	CONTRACTOR	DATE	MBTA	DATE
RELEASE OF ITEM FOR GROUT				
SURFACE PREPARATION COMPLETE				
SURFACE DAMP FOR REQUIRED TIME				
ALL VOIDS FILLED				
COLD WEATHER PROTECTION				
GROUT CURE COMPLETE <input type="checkbox"/> MOIST MEMBRANE <input type="checkbox"/>				

PRESSURE GROUT

RELEASE OF ITEM FOR GROUT	
EXCESS WATER REMOVED	
TENDONS GROUTED WITHIN (15) DAYS OF STRESSING	
GROUT PUMPED CONTINUOUSLY UNTIL CONSISTENT AT UPPER VENT (A STEADY STREAM OF GOOD GROUT BEFORE CLOSING)	
PRESSURE # _____ HOLD TIME _____ BEFORE CLOSING	
REMARKS:	



MATERIAL RECEIVING INSPECTION REPORT

CONTRACT NO. R20CN01 CONTRACTOR:

DATE: REPORT NO.:

MATERIAL RECEIVED:

DESCRIPTION:

QUANTITY:

SUBMITTAL NO.:

ACTIVITY NO.:

MANUFACTURER/SUPPLIER

RECEIVING INSPECTION REQUIREMENTS

REQUIREMENTS	REQD	REQD	SAT	UNSAT	REQUIREMENTS	SAT	UNSAT	N/A
MATERIAL CERTIFICATION					PHYSICAL CONDITION			
CERTIFICATE OF COMPLIANCE					PACKAGING			
SPECIAL TEST REPORTS					CLEANLINESS			
MANUALS					IDENTIFICATION/MARKINGS			
OWNER RELEASE FORM								

STORAGE AND MAINTENANCE REQUIREMENTS:

MATERIAL COMPLIES WITH CONTRACTURAL REQUIREMENTS:

☐ YES

☐ NO

COMMENTS:

CONTRACTOR REPRESENTATIVE

DATE:

MBTA REPRESENTATIVE

DATE:



POST TENSIONING INSPECTION REPORT

DATE _____

CONTRACT NO. R20CN01 CONTRACTOR: _____

DRAWING/REV.: _____ SUBMITTALS: _____

IDENTIFICATION/DUCT NUMBER: _____

PAY ACTIVITY: _____

	INSPECTION	CONTRACTOR	DATE	SURVEY		MBTA	DATE
				CONT	MBTA		
PLACEMENT	ELEVATION OF DUCT						
	DUCT PROFILES SMOOTH & CORRECTLY SHAPED						
	DUCT JOINTS MATED & SEALED WITH DUCT TAPE						
	ALL HOLES IN DUCT REPAIRED						
	SECURED TO PREVENT DISPLACEMENT DURING CONCRETING						
	DRAINS INSTALLED AT LOW POINTS						
	VENTS INSTALLED AT HIGH POINTS						
	BEARING PLATES SECURELY ATTACHED, ELEVATIONS & CONFIGURATION						
TENSIONING	ANCHOR HEADS FREE FROM CORROSION						
	WEDGES FREE OF RUST & STEEL SHAVINGS						
	PRESTRESSING STEEL FREE FROM CORROSION AND PROTECTED						
	EACH DUCT HAS THE SAME HEAT/REEL NUMBER INSTALLED						
	TENDONS STRESSED SLOWLY- <input type="checkbox"/> ONE END <input type="checkbox"/> BOTH						
	WEDGES SEATED EVENLY						
	TAILS CUT BY SAW						
	EQUIPMENT ID _____						
	HEAT/REEL # _____						
	ELONGATED MARK INITIAL _____ FINAL _____						
	FINAL ELONGATION REQUIRED ACTUAL REQUIREMENT _____ 5% MAX DIFF						
	Final Tension						
REMARKS							



STRUCTURAL STEEL INSPECTION REPORT

DATE: _____

CONTRACT NO. R20CN01

CONTRACTOR: _____

STRUCTURE: _____

WELDING CODE: _____

DRAWING/REV.: _____

PAY ACTIVITY: _____

SUBMITTAL: _____

AREA/LOCATION/ELEVATION/GRID/BAY/COL.LN. _____

CONFIGURATION	ITEM	INSPECTION	CONTRACTOR	DATE	SURVEY		MBTA	DATE
					CONT	MBTA		
	1.	ANCHOR BOLTS						
	2.	BASEPLATE ELEVATION & BEARING						
	3.	BRIDGE BEARING TYPE & LOCATION						
	4.	COLUMNS/BENTS						
	5.	BEAMS/GIRDERS						
	6.	EXPANSION JOINTS						
	7.	STIFFENERS						
	8.	DECK INSTALLATION						
	9.	HIGH STRENGTH BOLTING						
	10.	EXPANSION ANCHORS						
	11.	WELD INSPECTION COMPLETE						
	12.	FINAL ELEVATION TOP OF STEEL						
REMARKS								

MBTA NONCONFORMANCE REPORT (NCR)

Report No.: _____

Contract No. R20CN01

Contract Name: _____

Reference Documents: ☐ Spec. _____ ☐ Dwg. _____ ☐ Other _____

DESCRIPTION:

(Attach additional sheets as required)

Originator: _____

Date: _____

Res. Eng.: _____

Date: _____

DISPOSITION:

☐ Accept as is ☐ Rework ☐ Remove & Replace ☐ Repair

(Attach additional sheets as required)

Preventative Action:

Design Consultant: _____

Date: _____

Resident Engineer _____

Date: _____

Project Manager: _____

Date: _____

Director, QA: _____

Date: _____

Corrective / Preventive Action Complete

Contractor: _____

Date: _____

Other: _____

Date: _____

Other: _____

Date: _____

Resident Engineer: _____

Date: _____

END OF SECTION

SECTION 01500

CONSTRUCTION TEMPORARY FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section specifies the general requirements for furnishing, installing, operating and removing construction temporary facilities and temporary controls during construction.

1.2 TEMPORARY FACILITIES AND SERVICES DURING CONSTRUCTION

- A. During the progress of the Work, provide all temporary facilities and services not limited to, the following:

1. Temporary utilities required include but are not limited to:
 - a. Connection to Owner's water service, and distribution.
 - b. Connection to Owner's electric power service for temporary electric power and light for construction use.
 - c. If Owner's existing utility services are not sufficient, provide utility connections as required to support construction operations. Comply with Code and provider utility company requirements for installation of temporary utilities.
 - 1) Locate utilities to not interfere with construction operations or use and occupancy.
 - 2) Do not locate utilities that would create a hazard, or obstruct vehicular or pedestrian movement.
2. Use Charges: The Owner will pay reasonable use charges as part of its metered service, for Contractor's use of electricity and water at the site; the Contractor shall pay all provider utility charges, labor and materials costs, and other charges associated with the installation, operation, and removal of the services, if required.
3. Water Supply
 - a. The Contractor may use the available water supply at the sites for construction purposes, so long as the water is not used wastefully. Provide all necessary piping and hoses to utilize the available sources of water.
 - 1) Provide drinking water with suitable cups for all personnel and workmen on the job.

- b. Remove the temporary water service at the completion of the Work.
- 4. Sewers and Drainage: If required by construction operations, provide temporary connections to city sewers to remove effluent that can be discharged lawfully. If sewers cannot be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.
 - a. Do not discharge soil, construction debris, chemicals, oils, bitumens and similar contaminants that might clog drains, sewers or pollute waterways before discharge.
 - b. Maintain temporary drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- 5. Light and Power
 - a. Make all arrangements for and provide all temporary light and power for all subcontractors and trades, except as otherwise provided herein. The temporary electrical service shall include, but not be limited to, all labor, materials, and equipment necessary to supply temporary power of adequate capacity for the project operations and testing. Provide and maintain any lights necessary to protect the Work or MBTA employees (see Section 01560, Article 1.06 and Section 01570, Article 1.04).
 - b. Subject to restrictions indicated, connect to and use the Owner's existing permanent building power supply for temporary light and power.
 - c. Furnish and install all temporary wiring, extension cords, sockets, and all lamps, both initial and replacement, used for temporary power and lighting systems.
 - d. All temporary electrical work shall be performed under the direct supervision of at least one Master Electrician, who shall be present on site at all times when such work is being performed.
 - e. Remove temporary power and lighting systems at completion of the Work.
 - f. Permanent electrical power and lighting systems which are in operating condition may be used, in lieu of the temporary service, for construction purposes, provided that the Contractor, (1) assumes full responsibility for the entire power and lighting systems, and (2) pays all costs for operation and restoration of the systems including relamping just prior to occupancy by the Authority.
- 6. Fire Protection
 - a. Take all necessary precautions to prevent fires at the Work. Provide and maintain adequate facilities for extinguishing fires, taking special precautions in the storage and use of solvents, paints, adhesives, and other flammable materials. No on-site burning or storage of rubbish will be

allowed.

7. Weather Protection and Heating During Construction

- a. Provide temporary, weather-tight enclosures and heat to permit construction work to be carried on during the months of November through March. These requirements are not to be construed as requiring enclosures or heat for operations that are economically infeasible to protect in the judgment of the Engineer. Included in this category, without limitations, are such items as Site Work, Excavation, Pile Driving, Steel Erection, Erection of Certain Exterior Wall Panels, Roofing, and similar operations.
- b. "Weather protection" means the temporary protection of that Work adversely affected by moisture, wind and cold, by covering, enclosing, heating or a combination thereof. Provide adequate protected working areas during the months of November through March as determined by the Engineer and consistent with the approved construction schedule to permit the continuous progress of Work necessary to maintain an orderly and efficient sequence of construction operations. Furnish and install weather protection material and be responsible for costs, including heating required to maintain a minimum temperature of 40 deg F at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials or the applicable general conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.
- c. As necessary and within 30 days prior to its expected need, submit to the Engineer in writing, for approval, three copies of proposed methods for weather protection and heating during the construction of those items requiring such protection.
- d. Installation and operation of weather protection and heating devices shall comply with safety regulations, including provisions for adequate ventilation and fire protection devices. Heating devices which may cause damage to finish surfaces shall not be used.
- e. Furnish and install one accurate Fahrenheit thermometer at each work area as designated by the Engineer. Provide, one additional accurate Fahrenheit thermometer for every 2,000 square feet of floor space where the work areas exceed 2,000 square feet.
- f. Assume all risks of damage by the elements to the work under the Contract.
- g. Protect work carried on, or materials used in the work or stored during extreme weather, against freezing, drying, wetting, snow or other harmful conditions, and heat, cover, or protect as required by good practice or as directed by the Engineer.

- h. Heating during construction shall mean providing protection from cold and moisture by covering, enclosing and heating materials and work under construction and providing suitable working conditions in all areas for all trades employed on the work. Provide all heating during construction and pay costs, including fuel, incurred. Supply and maintain means of properly heating the facility until it is accepted.
- i. For facilities and areas not presently being heated from existing sources, and as a result of construction, provide heating and ventilation in enclosed areas within the contract limit lines from the time of enclosure until the acceptance of the Project. The temperature shall:
 - 1) not be less than specified in any Section of the Specification.
 - 2) not be less than that recommended by the manufacturers of the materials incorporated in the Project, whether specified in the pertinent Section or not.
 - 3) be made available sufficiently in advance of any predetermined operation requiring advance heating before operations commence.
 - 4) not be less than required for the protection of all installed work as determined by the Specifications or determined by the Engineer within the range of not less than 55 deg F nor more than 75 deg F.
 - 5) The ventilation shall be adequate for:
 - a) the areas (volumes involved).
 - b) the personnel employed therein.
 - c) the operations planned, under execution or executed.
 - d) the insuring of no adverse toxic conditions.
 - 6) Heat and ventilation within buildings shall be, at all times, uniform and constant and shall have such controls as to insure this requirement, regardless of variances in external temperatures.
- j. Where the Contract includes more than one building, temporary heating shall be provided for each building, in accordance with the above provisions.
- k. The permanent heating system may be utilized for temporary heat if specifically authorized by the Engineer.
- l. Salamanders shall be allowed for unenclosed form of work and structural concreting operations only with the approval of the Engineer.
- m. Unit heaters or other methods of heating shall meet with the approval of

the Engineer. Install unit heaters and other heating equipment and operate in such a way that finished work will not be damaged. Any surface damaged by the use of unit heaters or other heating methods selected by the Contractor shall be repaired or refinished to the satisfaction of the Engineer at no cost to the Authority.

- n. Provide operating labor for continuous direct attendance, including frequent inspection of the system, emergency repairs, and keeping of temperature records. Continuous direct attendance shall include Saturdays, Sundays, and holidays, throughout the progress of the Work, unless otherwise permitted by the Engineer and so certified in writing.

1.3 SANITARY PROVISIONS

- A. Provide and maintain in a neat and sanitary condition, properly secluded, such accommodations for employees as may be necessary to conform to the Commonwealth of Massachusetts Department of Public Health Sanitary Code and all local by-laws and ordinances. Necessary conveniences, properly secluded, shall be provided and maintained for the use of the Engineer, satisfactory to the Engineer and sanitary authorities. No public nuisance will be tolerated.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01545

PROTECTION OF WORK AND PROPERTY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the general requirements for the temporary protection of work and property during the Contract period.

1.2 TEMPORARY PROTECTION

- A. After work is properly completed, be responsible for protecting work and for repairing, replacing, and cleaning of damaged work, so that all work is in perfect condition at the time of acceptance of the facility.
- B. Protect excavations, trenches, buildings, and materials at all times from rain, snow, ground water, backing-up or leakage of sewers, drains or other piping, and from water damage of any origin. Provide all pumps, piping, coverings, and other materials and equipment required or as specified.
- C. In addition to the weather protection specified in "Weather Protection" article, provide temporary watertight enclosures for openings in exterior walls and in roof decks when and as required to protect the work from damage by inclement weather, and to protect the existing structure and occupied spaces. Such protection shall be acceptable to the Owner.
- D. Coordinate installation and removal of watertight enclosures with the activities of the various trades to allow for the proper sequencing of work.
- E. Weathertight enclosures at openings in exterior walls shall be made reasonably secure, as determined by the Architect, to prevent against unauthorized access to the building through the enclosures.
- F. Protect sills, jambs, and heads of openings through which materials are handled.
- G. Protect concrete surfaces which are to receive work of other trades from any soiling which will prevent proper adhesion of subsequent work. The Contractor shall leave surfaces broom clean and free of blemishes at the time other subcontractors and trades begin the application of their work.
- H. Protect all exposed existing and new finished surfaces, such as walls, doors, floors, ceilings, treads, and platforms against mechanical damage, plaster drippings, oil, grease, paint, or other material which will stain the floor finish. Install and maintain protective coverings on finished floors in spaces where other work will be performed.
- I. Roof and waterproofed surfaces shall not be subjected to traffic nor used for storage of materials. The Contractor shall provide protection for such surfaces where some activity must take place in order to carry out the Work.

- J. After the work of a subcontractor has been properly completed, the Contractor shall be responsible for its protection and for repairing, replacing, or cleaning any such work which has been damaged by other subcontractors or trades or by any other cause, so that the entire work is in perfect condition at the time of Substantial Completion or partial utilization.
- K. Prior to any excavation work the Contractor shall relocate construction fencing as required to completely protect the work area and prevent injury to persons and property.
- L. Remove all temporary protection and coverings at the completion of the Work.

1.3 WEATHER PROTECTION

- A. Reference Standards: Comply with MGL Chapter 497, Acts of 1970, and "Weather Protection Standards" established by the Deputy Commissioner of the Massachusetts Department of Capital Asset Management.
- B. Definition: "Weather Protection" shall mean the temporary protection of that work adversely affected by moisture, wind, and cold by covering, enclosing, and/or heating. This protection shall provide adequate working areas during the months of November through March, as determined by the Owner and consistent with the approved construction necessary to maintain an orderly and efficient sequence of construction operations.
- C. Enclosures or heat for operations that are economically not feasible to protect, in the judgment of the Owner, including such items as site work, excavation and roofing, are not required.
- D. The Contractor shall furnish and install all weather protection materials required for the work or any part thereof, and be responsible for all costs, including heating required to maintain a minimum temperature of 40 degrees F. at the working surface.
- E. Provide temporary enclosures and heat to permit work to be carried on during the months of November through March, in compliance with M.G.L. Chapter 497.
- F. Comply with more restrictive provisions and requirements for methods of construction and/or curing of materials where indicated in the individual specification sections.
- G. If building heating systems are not in service or are not adequate, provide additional heating as indicated.
- H. Installation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection devices.
- I. Submit a proposed method for temporary heat satisfactory to the Owner, at no increase in contract price.
- J. If used, unit heaters shall be of the smokeless type and be installed and operated in such a way that finished work will not be damaged thereby. Salamanders shall not be used.
- K. Responsibility for Weather Protection: The Contractor shall be responsible for all weather protection and shall be liable for any damage to the existing structure, its equipment, furnishings and fixtures,

and the work, or any part thereof caused by the Contractor's failure to supply adequate and proper weather protection.

- L. Any work damaged by frost shall be promptly removed and replaced by the Contractor at no increase in contract price or contract time.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01550

HOT WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies "Hot Work" fire control procedures for contractors and their personnel, including cutters, welders and operators of heating equipment. Hot work is any work that utilizes or produces an ignition source.

1.2 SUBMITTALS

- A. Perform "Hot Work" operations as follows:

1. Ensure the safe handling of "Hot Work" equipment and the safe use of the particular "Hot Work" process.
2. Determine the combustible materials and hazardous areas present or likely to be present in the work locations.
3. Protect combustibles from ignition by the following:
 - a. Have work moved to a location free from dangerous combustibles.
 - b. If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustible properly shielded against ignition.
 - c. See that "Hot Work" is so scheduled that any operation which might expose combustibles to ignition is not started during the "Hot Work".
4. Give notice to the project office of the need to perform "Hot Work" operations and secure authorization from the Engineer.
5. Ensure that the cutter or welder secures his or her supervisor's approval that conditions are safe before going ahead with the work.
6. Ensure that fire protection and extinguishing equipment are properly located at the site.
7. Where fire watchers are required, see that they are available at the site.
8. Shall not use the signal rail system of a single rail track circuit as a negative return.
9. Procure all required permits as per Document 00700 - GENERAL CONDITIONS, Articles 5.1 and 5.2.

- B. Ensure the worker handles the "Hot Work" equipment safely and uses it so as not to endanger lives or property and:

1. has the approval of his or her supervisor and the MBTA project office before starting any "Hot Work";
2. does not perform any "Hot Work" where conditions are not safe;
3. continues to perform "Hot Work" only so long as conditions are unchanged from those under which approval was granted.

1.3 FIRE PREVENTION PRECAUTIONS

- A. Permit "Hot Work" only in areas that are or have been made fire-safe. Within the confines of a building or other enclosed structure, perform cutting and welding operations preferably in a specific area designed or approved for such work, such as a maintenance shop or a detached outside location. Ensure that such areas are of noncombustible or fire resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas. When work cannot be moved practicably, as in most construction work, make the area fire-safe by removing combustibles or protecting combustibles from ignition sources.
- B. Do not permit "Hot Work" in the following situations:
1. In areas not authorized by the project office;
 2. In sprinklered buildings while such protection is impaired;
 3. In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids or dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts;
 4. In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulphur, baled paper or cotton.
- C. Before "Hot Work" is permitted, the Engineer will give notification authorizing the "Hot Work", and designate precautions to be followed. He will have designated MBTA personnel inspect the work area for fire safety, as indicated herein, and which personnel will complete a "Hot Work" checklist. The Engineer will also assure himself of the following:
1. The "Hot Work" equipment to be used is in satisfactory operating condition and in good repair.
 2. Where there are combustible materials such as paper clippings, wood shavings or textile fibers on the floor, sweep the floor clean for a radius of 35 feet. Keep combustible floors wet, covered with damp sand, or protected by fire resistant shields. Where floors have been wet down, protect personnel operating arc welding or cutting equipment from possible shock.
 3. Where practicable, relocate combustibles at least 35 feet from the work site. Where relocation is impracticable, protect combustibles with flame proofed covers or otherwise shield with metal or fire resistant guards or curtains. Secure edges of covers at the floor so they are tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.
 4. Tightly cover wall or floor openings or cracks within 35 feet of the site to prevent the passage of sparks to adjacent areas.
 5. Suitably protect or shut down ducts and conveyor systems that might carry sparks to distant combustibles.
 6. Where "Hot Work" is done near walls, partitions, ceilings or roofs, or combustible construction, provide fire resistant shields or guards to prevent ignition. If welding is to be done on a metal wall, partition, ceiling or roof, take precautions to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, provide a fire watch on the opposite side of the work. Do not attempt welding on a metal partition, wall, ceiling or roof having a combustible covering, nor on walls or partitions of combustible sandwich type panel construction.

7. Do not undertake to perform "Hot Work" on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs if the work is close enough to cause ignition by conduction.
 8. Provide sufficient quantities of portable fire extinguishers, appropriate for the type of possible fire, at the work area. Where hose lines are available, connect them so they are ready for service.
 9. Suitably protect nearby personnel against heat, sparks, slag, etc.
- D. Require the services of Fire Watchers whenever "Hot Work" is performed in locations where other than a minor fire might develop, or where the following conditions exists:
1. Appreciable combustible material in the building construction or contents is closer than 35 feet to the point of operation.
 2. Appreciable combustibles are more than 35 feet away, but are easily ignited by sparks.
 3. Wall or floor openings within a 35 foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
 4. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings or roofs, and are likely to be ignited by conduction or radiation.
- E. Fire Watcher's responsibilities include:
1. Have fire extinguishing equipment readily available and be trained in its use.
 2. Be familiar with facilities for sounding an alarm in the event of fire.
 3. Watch for fires in exposed areas, and try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm.
 4. Maintain a fire watch for at least one half hour after completion of "Hot Work" operations to detect and extinguish possible smoldering fires.
- F. Where a Fire Watch is not required, make a Final Check Up one half hour after the completion of "Hot Work" operations to detect and extinguish possible smoldering fires.
- G. Have "hot tapping" operations or other cutting or welding on a flammable gas or liquid transmission or distribution utility pipeline performed only by a crew qualified to make hot taps.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work required under this Section. Costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

This Section specifies the general requirements for furnishing, installing, and operating temporary controls during construction.

1.2 SUBMITTALS

- A. Reports: Means and methods for providing dust control, ventilation and site specific security plan.

1.3 DEBRIS AND CLEAN UP

A. Debris shall:

1. Not be permitted to accumulate. The Work shall at all times be kept satisfactorily clean. Remove debris and rubbish as required by the Engineer.
2. Not be disposed of on-site. Under no circumstances shall open fires or incinerators be used for disposal of rubbish or debris.

B. Disposal of debris:

1. Do not throw rubbish, debris, and waste material from windows, platforms, or other parts of the facility. Wet down rubbish, dirt, and other dust-producing materials from time to time.
2. Immediately after unpacking, remove and dispose of all packing materials, case lumber, wrapping, or other rubbish from the site.

C. Cleanup:

1. Be responsible for all breakage of glass from the time the glazier has completed his work until the Contract is accepted by the Authority. Replace all broken glass and deliver the entire facility with all glazing in perfect condition, intact and clean. Broken glass shall be replaced in kind: the replacement of special glass shall conform to the original specification and the integrity of special sash shall be retained as specified.
2. Prior to final inspection, the entire exterior and interior of the facility within the Contract limit lines shall be cleared of all rubbish and thoroughly cleaned by the Contractor, including, but not restricted to, the following:
 - a. All construction facilities, debris, and rubbish shall be removed from the site.

- b. All finished surfaces within the facility shall be swept, dusted, washed, and polished. This includes cleaning of the work of all finished trades where needed. whether or not cleaning for such trades is included in their respective specifications:
 - c. Pipe and duct spaces, chases, and crawl spaces shall be thoroughly clean:
 - d. All equipment shall be in an undamaged, bright, clean, polished condition:
 - e. All glass shall be washed and polished, both sides.
- D. The Contractor shall have full responsibility for cleaning up during and immediately upon completion of his work, shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work, leaving the site clean, free of debris and in proper condition.
- E. Equipment or material shall not be left within any of the aforementioned areas after acceptance of the Contract without the written permission of the Engineer. Do not abandon any material at or near the site regardless of whether or not it has any value.

1.4 LAWS TO BE OBSERVED

A. Air Pollution Control

1. Comply with the provisions of Section 142B of Chapter 111 of the General Laws pertaining to air pollution within the Metropolitan Air Pollution Control District. The burning of trees, brush, and other combustible materials will not be permitted. Provide satisfactory methods of disposal without additional compensation.
2. On all Federal Aid Projects, submit evidence, to the Engineer, that the governing criteria issued by agencies of the U.S. government pertaining to prevention and control of air pollution can be met.

B. Prevention of Water Pollution

1. Attention is directed to Section 42 of the Massachusetts Clean Waters Act (Chapter 21 of the General Laws as amended).
2. On all Federal Aid Projects, submit evidence to the Engineer that the governing criteria issued by agencies of the U.S. government pertaining to prevention and control of water pollution can be met.
3. Further, during the performance of all work under the Contract, take sufficient precautions in the conduct of operations necessary to avoid contaminating water in adjacent streams or pond areas. All earthwork, grading, moving of equipment, water control in foundation areas, and other operations likely to create silting, shall be planned and conducted so as to avoid or minimize pollution in adjacent streams or pond areas. Water used for any purpose which has become contaminated with oil, bitumen, salt, or other pollutants shall be discharged so as to avoid affecting nearby waters. Under no circumstances shall pollutants be discharged directly into any adjacent stream or pond areas.

4. When water is used from natural sources for any operations, intake methods shall be such as to avoid contaminating the source of supply and maintaining adequate downstream flow when the source is a stream.

5. Attention is directed to Chapter 220. Acts of 1955, relative to inland waters.

C. [Not Used]

D. [Not Used]

E. Energy policy and Conservation Act

1. Comply with mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC Section 6321 et. seq.).

F. Environmental Violations

1. Comply with the Massachusetts Department of Environmental Protection Regulations for Releases of Oil and Hazardous Materials and all other requirements of the Environmental Protection Agency regulations of the Clean Air Act and Clean Water Act and any other provisions of law, or amendments thereto including the laws or regulations of local municipalities.
2. All diesel construction equipment used in this contract shall have emission control device installed, such as oxidation catalysts or particulate filters on the exhaust system side of the diesel combustion engine equipment.

1.5 [NOT USED]

1.6 PUBLIC SAFETY AND CONVENIENCE

- A. At all times until final acceptance of the Work by the Engineer, the Contractor shall protect the Work and shall take all precautions for preventing injuries to persons or damage to property on or about the site.
- B. The Contractor shall comply with all applicable laws, ordinances, rules, and regulations regarding the safety of persons or property or with regard to protecting them from damage, injury, or loss and shall not load or permit any part of the Work to be placed so as to endanger the safety of the Work.
- C. If the Contractor constructs temporary bridges or provides temporary crossings of streams, his responsibility for accidents shall include the roadway and sidewalk approaches as well as the structure of such crossings (also see Articles 1.04 and 1.05).
- D. The decision for routing traffic through or around the Work and provisions for the control of same will be made by the Engineer. Whenever it is deemed advisable, special detours will be provided for truck or bus traffic. Where deemed advisable by the Authority, traffic patterns and schedules will be studied in the design stage and included in the Contract Specifications. Highways and streets shall be closed to travel only as directed by the Engineer.
- E. Schedule the temporary or permanent closing of highways and city and town ways to travel only after consultation with the Police Chief and Fire Chief of the municipalities concerned. The temporary closing of highways and city and town ways shall be kept to a minimum.

- F. When detours around the Work are provided on existing city or town ways, maintain such city or town ways as required in Section 01570, Article 1.02 and be compensated as specified in that Article.
- G. Where new construction coincides with the present MBTA Transit System, carry on the work in a manner acceptable to the Engineer so that a reasonably safe uninterrupted transit flow is maintained through the Contract during the entire construction period. Provide and maintain in a reasonably safe condition the temporary approaches and the crossings of intersecting work.
- H. Maintain temporary roadways in a manner which will provide reasonably safe and convenient travel. When temporary roadways outside the contract limits are abandoned, remove the surfaces and grade to a smooth, neat, natural appearance, free from water pockets as directed by the Engineer.
- I. Abandon temporary or existing roads beyond the limits of the MBTA Transit System trackway slopes, but within the Contract limits, shall be excavated, graded, loaned, and seeded as directed to present a neat, natural appearance and provide for proper drainage. Compensation for this work will be included under the respective items of work involved.
- J. As directed, conduct the work such that abutters shall have reasonable access to their property. When public or private property is isolated by the closure of a highway or city or town way, the Contractor shall be responsible for providing such reasonably safe means of access to a public way as the Engineer deems essential and he shall be compensated for all work directed by the Engineer at the Contract unit prices for the type of work and materials involved. When it is necessary to leave materials and equipment upon the highway or city or town way, place them so as to cause the least possible obstruction to drainage, pedestrian, and other travel.
- K. When the work in any way affects the operation, management, maintenance, business or traffic on any railroad, carry on such work in a manner satisfactory to the said railroad; but all orders, directions, or instructions to the Contractor relative to Work under the Contract will be issued only by the Engineer. All possible vigilance in order to effectively guard against all accidents or damages on the railroad due to the work, and at all times during the progress of the Work manage and execute the same so as to cause the least possible interference with the operation, management, business or traffic of the railroad (also see General Conditions Article 5.08).

1.7 NOISE CONTROL

- A. Use every effort and every means possible to minimize noises caused by construction operations, which the Engineer may consider as objectionable. Provide working machinery and equipment designed to operate with the least possible noise, and when gearing is used, such gearing shall be of a type designed to reduce noise to a minimum. Equip compressors with silencers on intake lines. Equip gas or oil operated equipment with silencers or mufflers on intake and exhaust lines. Wherever practicable, electricity shall be used for power to reduce noise. Dumping bins, hoppers, and trucks used for disposal of excavated materials shall be lined with wood or other sound-deadening material if required. Where required by agencies having jurisdiction, certain noise-producing work may have to be performed during specified periods only.

1.8 DUST CONTROL

- A. Dust control shall be the responsibility of the Contractor, and furnishing dust control measures shall be at the Contractor's expense unless specified otherwise in the Contract Specifications.
- B. Notify the Engineer, in writing, what measures will be implemented to provide adequate dust control measures. If the actual dust control measures used on the work are inadequate, when directed by the Engineer, immediately provide additional dust control to rectify the situation at no additional expense to the Authority.

1.9 VENTILATION

- A. Provide adequate temporary ventilation in the HPCU Room after the existing ventilation system is disconnected and until the new ventilation system is operational.

1.10 SITE SECURITY AND ACCESS

- A. The Contractor shall prepare and submit to the Engineer for approval, a site specific security plan for the all phases of the Work. This plan shall be detailed to address all site security issues of the Work including all subcontractor efforts. The plan shall be maintained and updated as required throughout the Contract duration. The Contractor, Subcontractor, Vendors and Suppliers are required to comply with the approved site security plan at all times. The Contractor is required to provide identification badges for all employees including subcontractors. The badges must include personal photograph, name and employer and must be visible when worn at all times.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01565

RODENT CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section specifies rodent control within the limits of this Contract prior to and during site preparation and the specified work.

1.2 QUALITY CONTROL

- A. Exterminator Qualifications: Hold a current license issued by the Massachusetts Pesticide Board.
 - 1. Employ servicemen for work on this Contract, each having experience in rodent control procedures.

1.3 SUBMITTALS

- A. Submit rodent control procedures, indicating material, quantity, methods, and time schedule for extermination.
- B. Ten days prior to commencement of rodent control procedures, furnish name of rodent control licensed exterminator, date of initial rodenticide application, and methods and materials to be employed.
- C. Manufacturer's printed application instructions for the approved toxicants.
- D. Bi-weekly individual reports on activities, including location of sites treated, amount and types of rodenticides used during the month, and determinable results of the program.

1.4 LIABILITY

- A. The Contractor shall be liable for death or injury to persons or domestic animals in the use of the toxicants and shall determine the appropriate material from the materials list for each treatment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Limit toxicants in rodent baits to the following:

1. Antu.
2. Cyanogas.
3. Anticoagulant.
4. Zinc Phosphide.

PART 3 - EXECUTION

3.1 APPLICATION

- A.** Apply materials in strict accordance with EPA approved label directions and the Rules and Regulations of the Massachusetts Pesticide Board.
- B.** First Application – Blitz: Apply immediately after execution of the Contract and written release by the Authority. Use zinc phosphide or other specified toxicant with suitable bait, placed so as to attract the greatest possible number of rodents. The blitz application shall be applied prior to all other work except survey.
- C.** Anticoagulant, such as Warfarin, must be applied in accordance with manufacturer's standard recommended practice and as follows:
1. Place anticoagulant in sealed, moisture resistant containers such as glassine, paraffin blocks, or comparable protective material, and distribute as recommended.
 2. Place on moisture-resistant plate or pan, not in direct contact with earth, concrete, or masonry; protect from moisture, rain, snow or dust; in bait station or other suitable cover.
 3. Inspect anticoagulant bait a minimum of once each week and replenish with fresh material when necessary.
- D.** Maintain accurate records of placement, type, and volume of rodent baits applied.

3.2 MAINTENANCE

- A.** Within one week after initial application, institute a program of maintenance to rid structures and adjacent areas, within limits of this Contract, of rodents, and prevent their migration to abutting properties. Maintenance shall continue for the duration of the Contract.
1. Apply Warfarin in a 2- 1/2 per cent mixture with suitable cereal in structures and torpedo form in open areas.
 2. Renew toxic bait semi-monthly throughout maintenance period and as required by the Massachusetts Pesticide Bureau Requirements.

3.3 CLEAN UP

- A. Remove carcasses daily and dispose of properly according to law.
- B. Upon completion of operations at site, remove remaining exposed bait or anticoagulant packages and dispose of properly according to law.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0213.202 - RODENT CONTROL.

ITEM NO.	DESCRIPTION	UNIT
0213.202	RODENT CONTROL	AN

END OF SECTION

SECTION 01568

CONSTRUCTION SAFETY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section specifies requirements to establish a practical, sound, and effective program for the prevention of construction accidents, and to assign specific responsibilities to Contractors for program compliance.
- B. Contractors and their supervisors must control hazardous activities and conditions within their respective areas of contract responsibility.

1.2 SUBMITTALS

- A. Safety and Health Plan: The contractor shall, within thirty (30) days after receipt of the award of a contract, submit for approval to the MBTA, a detailed operational project-specific Safety and Health Plan.
- B. Safety Supervisor: The Contractor shall within thirty (30) days after receipt of the award of a contract submit the resume of the qualifications and work experience of the designated Safety Supervisor proposed for assignment to the Project. No construction work shall begin until the project Safety Supervisor has been approved by the MBTA. The Safety Supervisor shall have a minimum of 5 years of experience in construction safety or a related field. See Section 00700 for qualifications.
- C. Monthly Accident Experience Summary: The Contractor shall submit an Accident Experience Report monthly during the course of construction to the MBTA.
- D. Industrial Industry Records: Prior to start of work, the Contractor shall submit their Injury/Illness Records for the previous 3 years. In addition, the Contractor shall submit annually to the MBTA all subsequent Illness/Injury Reports for the duration of the project.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 SAFETY AND HEALTH PLAN

- A. The Contractor shall submit a project Safety and Health Plan prior to the start of construction. (See attached example.)

3.2 SAFETY SUPERVISOR

- A. Complete daily safety inspections of the job site and contiguous public areas, and take any corrective actions to eliminate unsafe conditions.
- B. Establish and implement a project safety training program for supervisors and employees as applicable to their job.
- C. Attend project safety meetings.
- D. Review Foreman accident and investigation reports, and initiate corrective action to prevent reoccurrence.
- E. Maintain copies of all Contractor Safety Reports.
- F. Assist Foremen in accident investigations.
- G. Encourage establishment of incentive programs designed to recognize individual employee safety efforts and contributions towards improved safety.
- H. Prepare a Safety Audit Checklist and complete the checklist each week during the course of construction. The completed Audit Checklists shall be submitted to the Authority weekly.
- I. The Safety Supervisor needs to be on the project site when major work tasks are being performed. During work periods when the Contractor is not performing contract work, the Safety Supervisor can be absent from the project site with permission from the Authority.

3.3 ACCIDENT INVESTIGATION

- A. Serious accidents shall be reported immediately to the MBTA Resident Engineer. Contractors shall issue standing orders to all supervisors directly in charge of operations that the scene of the accident shall not be disturbed, except for rescue or other emergency measures, until otherwise directed. Contractor's forces either witnessing or party to the accident shall be detained at the site to provide detailed accounting of facts.
- B. All reports shall be submitted to the MBTA. The accident investigation shall generate appropriate recommendations for corrective actions to prevent similar recurrence of similar accidents.
- C. The requirements of MBTA Safety Procedure 7.3 Contractor Safety Violation Program shall be followed by the Contractor when completing an accident report.

3.4 FIRST AID FACILITIES

- A. In formulating the Health and Safety Plan, the Contractor shall provide for the establishment and staffing of appropriate first aid facilities for the treatment of on the job injuries.
- B. Off-site medical treatment of employee injuries shall be performed at medical facilities named in the Contractor's Safety Submittal.

3.5 EMERGENCY TELEPHONE NUMBERS

- A. To ensure that emergency actions are promptly taken, Contractors shall post emergency telephone numbers in conspicuous places.

3.6 ORIENTATION PROGRAM

- A. The Contractor shall establish and maintain an orientation program for new employees which shall include:
 - 1. For each individual the hazards present in their work assignment and in the general area in which he will be working.
 - 2. Personal protective equipment required.
 - 3. Instruction in the proper procedure for reporting unsafe job conditions which he/she may encounter.

3.7 RIGHT OF WAY SAFETY AWARENESS

- A. All Contractor and sub-contractor personnel shall complete the MBTA Rapid Transit right-of-way safety training and/or the MBCR Commuter Rail right-of-way safety training prior to entering the project site. ROW safety training will be required on all MBTA property including the RR track, transit stations, parking garages and maintenance car houses. Personnel will not be allowed on the job site unless they have attended a Right-of-Way Safety Awareness training session. Workers are required to carry their certification card while on site.

3.8 OSHA

- B. The Contractor shall comply with the OSHA 1926 Construction Safety Standards that apply to the project work. The Contractor shall meet the reporting requirements, and employers with eleven (11) or more employees must meet recordkeeping requirements.
- C. All Contractor and Sub-Contractor personnel shall possess an OSHA 10 Hour Certification card when working on the project site.
- D. All fatality cases and/or serious accidents and illness shall be reported to OSHA immediately by phone to an Occupational Safety and Health Area Office. Employers must report immediately all blasting accidents.
- E. Part of the OSHA requirements is that each employer must post in a prominent location the "Safety and Health Protection on the Job" poster. The poster briefly states the intent and coverage of the Act. Failure to post this document is a citable offense under the Act.

3.9 PROSECUTION OF THE WORK

- A. The Contractor shall take all reasonable precautions in the performance of the work to protect the safety and health of its employees and members of the public and shall comply with all applicable MBTA, Local, State and Federal safety and health regulations and associated reporting requirements.
- B. The Contractor Safety Supervisor is charged with sole responsibility of on-site safety management under the direction of the Contractor Project Superintendent. All potential safety hazards

identified shall be promptly corrected. The Safety Supervisor shall complete daily reviews of the project site and document then results on the inspection.

- C. The MBTA shall notify the Contractor of any non-compliance and of the corrective action required. This notice, when delivered the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the non-compliance. The contractor shall immediately take corrective action required after receiving the notice, the contractor shall immediately take corrective action. If the contractor fails or refuses to take corrective action promptly, the MBTA may, without prejudice to other legal or contractual rights, issue an order stopping all or part of the work; and may subject contractor to safety violation assessments as deemed appropriate by the MBTA. Resumption of work may be issued by the MBTA Safety Department.
- D. The Contractor shall maintain an accurate record of exposure data on all accidents and incidents occurring under this contract and report this data in a manner prescribed by the MBTA.
- E. The Contractor shall be responsible for all its lower-tier sub-contractor's and vendor's compliance.
- F. Contractor management shall make a commitment for accident prevention and fire prevention. Safety shall take precedence over schedule and production. Enforcement action is mandatory.

3.10 WORK AUTHORIZATIONS

- A. The following work authorizations will be issued by the MBTA:
 - 1. Excavation
 - 2. Hot Work
 - 3. Confined Space Entry
 - 4. Cranes and Suspended Platforms

3.11 WORKING NEAR THE THIRD RAIL AND/OR CATENARY

- A. When working on or near the third rail or catenary, when the power is off, the contractor must have a third rail or catenary high-voltage warning device on the job site approved by the MBTA Power Department. This device will warn work crews if the third rail or catenary becomes energized at any time during work activity involving the right-of-way or near the catenary. The Contractor shall coordinate all work near the third rail or catenary outside the Carhouse with the MBTA Power Department. For all work inside the Carhouse, catenary will be de-energized by the Carhouse personnel while construction work takes place in adjacent work areas. Cooperate with the Authority's lock out/tag out procedure for de-energizing track catenary.

3.12 HAZARDOUS SUBSTANCES

- A. Any Contractor who uses hazardous substances on the hazardous substances list to which workers might be exposed under either normal work conditions or reasonable foreseeable emergency conditions must provide those workers with the required hazardous substance information.

3.13 PERSONAL PROTECTIVE EQUIPMENT

- A. All Contractor personnel must wear the required personal protective equipment when on the job site. Personal protective equipment includes but not limited to hard hats, safety vest, safety glasses and proper footwear.

3.14 PROTECTION OF THE PUBLIC

- A. All necessary precautions to prevent injury to the public or damage to property of others shall be taken. The public is defined as all persons not employed by or under contract or subcontract to the MBTA. Installation of temporary barriers and/or fencing designated to protect the public shall be reviewed and approved by the MBTA.
- B. Work shall not be performed in any area occupied by the public unless specifically permitted by the contract or in writing by the MBTA.

3.15 SUBSTANCE ABUSE/PREVENTION/TESTING PROGRAM

- A. The Contractor shall establish a substance abuse policy and testing program that includes the following elements:
 - 1. Deterrence.
 - 2. Treatment and Rehabilitation.
 - 3. Detection.
 - 4. Enforcement.
- B. The MBTA reserves the right to approve the proposed substance abuse program prior to commencing the contract.
- C. Whenever any of the following conditions occur, the Contractor personnel involved will be required to submit to a drug and alcohol screen:
 - 1. Any event on/or involving MBTA property or personnel that results in a fatality.
 - 2. Any personal injury to a Contractor employee, or member of the public which requires or should reasonably require medical attention.
 - 3. Any event causing significant or unusual property damage, as determined by an MBTA official.
 - 4. Any event which appears to involve a violation of MBTA rules which poses a safety threat to employees or members of the public. The employees in these situations shall be tested unless at the time of the accident/incident the employee's performance can be completely discounted as a contributing factor to the accident/incident. The drug and alcohol screen should be completed immediately, but absent unusual circumstances, not more than eight (8) hours after the accident/incident in question occurred.
 - 5. In the vent of hospitalization and unless medically precluded, a drug and alcohol screen shall be ordered at the treatment facility if treatment is expected to exceed eight (8) hours. This screen will be identical to that utilized in probable cause.

3.16 CONDUCT OF TOURS

- A. Group tours must be cleared through the MBTA, allowing maximum advance notice and in compliance with MBTA Policy and Procedures.

- B. MBTA will coordinate the tour arrangements and ensure notification to the Contractors Project Manager.

3.17 HOUSEKEEPING

- A. A basic concept in any effective accident prevention program is "good housekeeping." No one item has a great impact on the overall success of a safety program for a construction project.
- B. During the course of construction, work areas, passageways and stairs, in and around buildings and structures, shall be kept clear of debris. Construction materials shall be stored in an orderly manner. Storage areas and walkways on the site shall be maintained free of depressions, obstructions and debris.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

NAME OF GENERAL CONTRACTOR

PROJECT-SPECIFIC SAFETY PLAN

WORK PLATFORMS FOR RIVERSIDE CARHOUSE

325 GROVE STREET

NEWTON, MA

DATE:

DISCLAIMER

The information contained herein was prepared and presented with reasonable care and is based on the most reliable information available to the author. The Commission makes no warranty, expressed or implied, of the fitness, accuracy or completeness of this information. Judgments as to the suitability of the information herein for the user's purposes are necessarily the user's responsibility.

INTRODUCTION

The Contractor shall have sole and complete responsibility for the implementation of a worksite safety plan and shall take necessary precautions for the health and safety of employees and fully comply with applicable provisions of all sections of 29 CFR 1926-OSHA Construction Industry Safety and Health Standards, 29 CFR 1910-OSHA General Industry Safety and Health Standards, National Fire Protection Association codes, City of Chicago Fire Prevention Code, National Electrical Code, all applicable American National Standards Institute standards, City of Chicago Building Code, and all standards or codes referred to in the listed document and any other applicable standards.

Due to the changing nature of health and safety regulations, and because new information is constantly becoming available, this plan is subject to change.

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NAME OF CONTRACTOR
PROJECT-SPECIFIC SAFETY PLAN (PSSP)
WORK PLATFORMS FOR RIVERSIDE CARHOUSE
325 GROVE STREET, NEWTON, MA

NOTE: Text in italics is instructional in nature and should not be included in a contractor's published PSSP. Highlighted sections are text that should be modified to meet specific needs.

1.1 WORKPLACE SAFETY AND HEALTH POLICY

POLICY STATEMENT:

(Insert Safety Policy Statement here.)

1.2 THE PROJECT-SPECIFIC SAFETY PLAN (PSSP)

Name of Contractor has the project goal of ZERO accidents and ZERO injuries, with work tasks designed to minimize or eliminate hazards to personnel, processes, equipment, and the general public. No worker should ever perform a task that may endanger their own safety and health or that of others.

This PSSP outlines the Environment, Safety, and Health (ES&H) requirements and guidelines developed for MBTA Contract No. R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE. These requirements are written to help protect site personnel, visitors, and the general public from exposure to potential E S & H hazards on this job site. There are several plans and actions that are included to ensure that we act to protect the environment, the general public, as well as our workforce during the construction phase of this project. Site-specific individual ES&H Plans required for this PBC project are described in Section 2.2 (Project-Specific Safety Plan Application).

This plan shall be updated if there are major changes to project conditions, situations, or exposures, and those revisions shall be noted on the document. An employee acknowledgement form documents that each employee understands the PSSP and will implement these safety and health requirements on this job site. A copy of that form can be found in Appendix B of this plan.

1.3 GENERAL CONTRACTOR AND SUBCONTRACTOR SAFETY PLANS

Our subcontractors are required to submit their individual site-specific safety plan (SSSP) at least 10 days prior to the pre-construction meeting. Their safety and health plan is reviewed by our Project Manager/Safety Manager to assure that they meet the requirements of the PBC for site safety and risk control. A template for the Subcontractor Site-Specific Safety Plan is included in Appendix D of this plan and is provided to those subcontractors who either have no written site-specific safety plan or whose safety plan does not meet the requirements set out in the Subcontractor Site-Specific Safety Plan.

SECTION 2 – SCOPE OF WORK

2.1 SCOPE OF WORK

(Insert description of specific contract responsibilities. Briefly describe the scope of work; contract value, % remodel, % new construction; and duration of project.)

We are providing construction services for the scope of work as specified in PBC Contract #R20CN01. Construction services include the following:

2.2 PROJECT-SPECIFIC SAFETY PLAN APPLICATION

(Describe the type of project/facility/# of sq. feet, # stories or max. height of construction; location/neighborhood description; residential, commercial, mixed use community, etc. Describe any unusual site conditions/exposures; include an overview of activities or tasks that subcontractors will perform.)

The following independent ES&H written plans are located in Appendix A of this PSSP and ensure that the Contractor is in compliance with regulatory requirements.

The following stand-alone plans are included in Appendix A:

- ☐ Confined Space Entry- permit-required confined spaces (as applicable) shall meet requirements specified under OSHA in 29 CFR 1910.146, should they be identified as part of the construction activities, or if the owner has designated such an area as a permit-required space for their operations.
- ☐ Fall Protection Plan-a written plan requiring 100% fall protection on this project is required for all workers where construction activities exceed a 6 foot minimum and is in compliance with 29 CFR 1926 Subpart M, Appendix E.
- ☐ Hazard Communication Plan-a written Hazard Communication Plan, describing how the standard will be implemented. All of the elements must be addressed and these include: labeling, MSDS, Employee Information and Training, and HCS communication on multi-employer worksites. A checklist for compliance per OSHA requirements is included to be certain that we are in compliance with 29 CFR 1910.1200.
- ☐ Pollution Prevention Plan-a written plan for spill prevention and for managing construction debris, (handling, removal, load securing, including roll-off containers, frequency of removal, material storage) assures compliance with regulatory requirements.
- ☐ Hazardous Material Storage Plan-a written plan that details material storage and handling issues; i.e. paint and solvents, fuel storage, and refueling processes includes spill prevention and containment precautions. Vehicle and equipment storage and field maintenance work are addressed to prevent environmental contamination to our site.
- ☐ Temporary Utilities Plan-a written plan detailing how temporary and fixed utilities will be connected and supported is required to minimize or eliminate utility disruption on site. This includes a one-call "locate plan" and log. A site sanitation plan for sewage collection, potable water provisions, and domestic water connections to minimize or eliminate potential biohazards from this work site is included.

SECTION 3 – PROJECT SAFETY MANAGEMENT RESPONSIBILITIES AND AUTHORITY

3.1 SAFETY RESPONSIBILITIES

The safety responsibilities of our personnel assigned to this job site include:

(Identify the safety roles and responsibilities of the personnel Contractor has assigned to this project, including Executive Management.)

SECTION 4 – ADMINISTRATIVE PHASE

4.1 PROJECT SAFETY AND HEALTH COMMITTEE

Name of Contractor has a Project Safety Committee including representation from the following subcontractors on this job site. Weekly safety meetings are required, and are documented with dated sign-in sheets. Safety topics discussed in the superintendent's weekly meeting are incorporated into each subcontractor's tool box safety meetings. Each subcontractor is required to hold their respective tool box safety meetings and submit copies of their agenda and sign in sheets to our project superintendent.

Members include representation from each trade on this site.

- Chairperson (Project Superintendent) Cell #: _____
- Subcontractor (Foreman) Cell #: _____
- Subcontractor (Foreman) Cell #: _____
- Subcontractor (Foreman) Cell#: _____

Charter of the Safety & Health Committee: The Safety & Health Committee represents the mutual interests of our company and our subcontractor personnel to reinforce our joint commitment to completing this project with zero injuries. Injuries that occur on this site are reported immediately to our Project Superintendent. A review of all incidents, including near misses is discussed during the Safety and Health Committee meeting. All potential unsafe conditions, relevant safety training programs, safety awareness topics, safety audit results, and related safety issues are also incorporated into our Superintendent's project safety meeting. Foremen are encouraged to relate any specific safety concerns and issues to the Project Superintendent, who has the responsibility for ensuring that an appropriate corrective action plan (CAP) is developed and implemented.

4.2 SAFETY ORIENTATION

Contractor will implement a safety orientation program. The PBC, Commission Representative and PBC Program Safety Manager will meet with our Project Superintendent/Safety Manager for a pre-construction meeting to review our project-specific safety plan, job site safety procedures and requirements for work on this PBC job site. Topics will include:

- PSSP Requirements
- PBC Safety Rules and Disciplinary Policies
- Incident Reporting and Record Keeping Policies
- Safety Metrics
- PBC Safety Inspections and Audits
- Corrective Actions Plan (CAP)
- How to Handle OSHA Visits

Employees new to this project, including new hires and transfers, must attend a project-specific-safety orientation on their first day and sign an acknowledgment form indicating they attended and understood the safety orientation. Any employee who is unsure of any information presented in the orientation must

request clarification. Employees who do not participate in the project orientation or refuse to sign the acknowledgment cannot work on this PBC project.

4.3 AWARENESS CAMPAIGN

Contractor's safety awareness program includes the following elements: signs, posters, banners, stickers for hard hats, focus briefings, etc. These are used to promote worker safety awareness, identify our potential worksite exposures, implement appropriate hazard controls, thereby helping us to achieve our safety goals. We supplement the PBC awareness program with safety information specifically applicable to the scope of work on their individual projects.

The project safety bulletin board is maintained by our Project Manager/Safety Manager and is our primary information point for the project safety awareness campaign. Bulletin boards are located in our job site office.

4.4 SUBCONTRACTOR PSSP ALIGNMENT MEETING

A subcontractor PSSP alignment meeting was held on DATE before initiating project work. This meeting was to review project requirements for safety and risk control. The following subcontractor representatives attended the meeting:

1. *Name, title, and affiliation*
2. *Name, title, and affiliation*
3. *Name, title, and affiliation*
4. *Name, title, and affiliation*
5. *Name, title, and affiliation*
6. *Name, title, and affiliation*
7. *Name, title, and affiliation*

Name of Contractor presented project-specific safety requirements, including a review of our various roles and responsibilities, an initial overview of project risks, and elements of hazard control appropriate to potential exposures.

4.5 TRAINING

Name of Contractor has a comprehensive safety and health training program tailored to the scope of work for this project. All employees receive a project safety orientation upon assignment to the project. Topics include but are not limited to:

- *Fall Protection*
- *Scaffold Safety*
- *Ladder Safety*
- *Hazard Communication*
- *Housekeeping*
- *Lock Out/ Tag Out*

Training records are maintained electronically and/or on site in the job site office. Should OSHA visit our job site, these training records are one indication of our implementation of an active safety program on this site.

4.6 AUDITS AND INSPECTIONS

The Project Superintendent/Safety Manager has implemented a safety audit and inspection program for this PBC job site. The Project Manager/Superintendent/Safety Manager review safety inspection/audit findings and the corrective action plan initiated. Copies of safety audit and inspection forms are included in Appendix B.

4.7 MEETINGS

"All hands" safety meetings are scheduled to review safety inspections, findings, and corrective actions taken; critical safety procedures, discuss recent workplace incidents, and to celebrate safety milestones. The Project Manager/Superintendent should schedule routine "all hands" meetings in advance or set a regular date/time to be sure that all workers can plan to attend this safety meeting. Records of these meetings are on file in the job site office with attached attendance sheets.

Contractor shall conduct a project specific safety orientation for all Subcontractor personnel who work on the project.

Contractor shall conduct a pre-mobilization safety meeting with each trade prior to the trade commencing work and keep minutes of the meeting.

Contractor shall hold daily "toolbox" safety meetings prior to the start of each work shift. The meeting shall have a duration of 10 to 15 minutes and must be documented using the Safety Meeting Attendance Sheet in Appendix A.7.

Contractor shall designate a safety representative to participate in a monthly meeting of the program Health and Safety Committee. The meeting is approximately one hour in duration.

4.8 MEASUREMENT AND REPORTING

4.8.1 Emergencies

To accurately report all incidents, Name of Contractor has posted an emergency communications system for the events listed below:

<i>All Incidents</i>	<i>Proj Supt.</i>	<i>xxx.xxx.xxxx</i>
<i>Hazardous Material Exposures</i>	<i>Enviro. Engineer</i>	<i>xxx.xxx.xxxx</i>
<i>Fires/Explosions</i>	<i>Fire Dept.</i>	<i>xxx.xxx.xxxx</i>
<i>Medical Emergencies</i>	<i>First Aid/Medical</i>	<i>xxx.xxx.xxxx</i>
<i>Site Security</i>	<i>Security</i>	<i>xxx.xxx.xxxx</i>

4.8.2 Measurement

The Project Manager/Safety Manager has established a measurement system to provide indicators of safety performance on this project. These following metrics will be accumulated and reported to the PBC.

- Total number of person hours worked
- Total number of incidents incurred
- Total number of recordable incidents
- Total number of near misses incurred
- Consecutive days without a recordable incident

- Consecutive days without a days-away-from-work incident
- Days-away-from-work incident rate
- Recordable incident rate
- Number of monthly audit findings

4.8.3 Incident Reporting

The Contractor shall investigate all incidents and forward copies of the incident report, including the IL Form 45, to the Commission Representative within 4 hours of the incident. An incident report must be provided for: near misses, first aid, recordable injuries, third party property damage or personal injury, and builders risk claims.

Employees involved in or witnessing an injury or near miss must immediately report it to the responsible supervisor, who in turn immediately relays the report to the Project Superintendent. No supervisor may decline to accept or relay a report of injury or significant near miss from a subordinate.

The Project Superintendent must ensure that all incidents are reported to the Commission Representative within four hours of occurrence. The Project Superintendent reviews and attaches a copy of the subcontractor's incident report to his report which demonstrates our "due diligence" in incidence reporting as well as initiating and monitoring corrective action plans. Copies of all incidents reported, including near misses, must be maintained on site as well as in our office.

The Superintendent or Project Safety Manager must notify the local OSHA office immediately if an accident involves the death of an employee or hospitalization of three or more workers.

4.8.4 MONTHLY FIELD SAFETY REPORT

Contractor shall submit a written Monthly Safety Report to the Commission Representative. The Report shall include the total labor hours, the number of project safety orientations and the dates, an accident/incident summary log and the drug and alcohol testing results for the project.

4.9 INCIDENT INVESTIGATIONS

All accidents and significant near misses are investigated by the Project Superintendent/ Safety Manager. Copies of these incident reports are provided to the Commission Representative and are also reviewed by the PBC Program Safety Manager during project visits.

All incidents shall be investigated within 4 hours of occurrence and an incident report filed immediately following the occurrence. If there is insufficient information to answer all questions, the incident will be reported anyway. The missing information will be provided to the Commission Representative when it becomes available. Corrective actions must be implemented and any worker compensation or liability claims are reported to our insurance carrier immediately.

4.10 RESPONSIBILITY/IDENTIFICATION OF KEY LINE PERSONNEL

Project : _____

Address: _____

Telephone Fax Email

(XXX) XXX-XXXX (XXX) XXX-XXXX _____

Executive Manager Contact Information

Project Manager: Contact Information

Project Superintendent: Contact Information

Safety Manager: Contact Information

Other: Contact Information:

The personnel listed above have the authority and responsibility for implementing the provisions of this project-specific safety plan.

4.11 MEDICAL REQUIREMENTS AND WORKERS COMPENSATION

Name of Contractor's Safety Manager has established and implemented the following medical requirements for this project:

4.11.1 Functional Capacity Evaluations (FCEs)

- ☐ No FCEs required.
- ☐ FCEs are to be determined by the Safety Manager.
- Position 1 TBD
 - Position 2 TBD
 - Position 3 TBD
 - Position 4 TBD
 - Position 5 TBD

FCEs are conducted by medical provider name, phone, and location.

4.11.2 Substance Abuse Tests

The Contractor requires a substance abuse program for contractor personnel working on the project.
(Include policy statement here.)

4.11.3 Medical Services

The following clinic and/or hospital provide emergency medical treatment to workers injured on this job.

Facility Name and Location Address + Telephone #.

4.11.4 Emergency Medical Response

The Contractor displays posters with emergency telephone numbers and locations of emergency facilities in visible locations and at selected phone locations throughout the project area (including subcontractor facilities). The following information is provided:

- *Hospital name, location, and number (consistent with selected medical treatment facilities)*
- *Physician name, location, and number (consistent with selected medical treatment facilities)*
- *Police department name, location, and number*
- *Fire department name, location, and number*

4.11.5 Workers Compensation Program

We are insured by Name of Insurance Company. If a workers compensation loss occurs, our Human resources representative handles all communication with the insurance carrier. The worker compensation policy covering our employees on this project is:

Worker Compensation (WC) carrier name, address and policy number

4.11.6 Medical Monitoring

Potential health hazards associated with this project require implementation of the following medical monitoring has been established.

Labor Classification	Monitor for	Comments
All employees	Hearing	Pre-employment, annual, and exit exams
_____	_____	_____
_____	_____	_____

(The Safety Manager administers the medical monitoring program. If no medical monitoring program is necessary for this project, simply state that it is not required.)

SECTION 5 – PRECONSTRUCTION PHASE

5.1 PROJECT RISK ANALYSIS AND SAFETY SPECIFICATION DEVELOPMENT

A project-specific risk analysis will be conducted. Using the project-specific risk analysis checklist, the Project Manager/Safety Manager leads this analysis to document potential exposures that may impact the work, surrounding facilities, equipment, workers, or the public at large. The analysis includes locating, documenting, and photographing items such as:

- Overhead and underground power lines
- Sewer and water utilities
- Existing building interferences
- Crane access ways
- Traffic
- Security
- Fences
- Water hazards
- Existing geographical and environmental conditions
- Confined spaces

Upon completion of the Project-Specific Risk Review Checklist, potential high-risk activities are indicated. This form is included in Appendix B.

5.2 COMPETENT PERSON SUBMISSION REVIEW

Name of Contractor and our subcontractors identify the OSHA regulated competent persons for work or tasks that require this level of expertise. The supervisor of the competent person must certify the specific competencies of the named competent person in writing.

The supervisor and competent person sign and submit the Competent Person form located in Appendix B of this plan and provide to the Project Manager.

5.3 SUBCONTRACTOR SAFETY PLAN SUBMISSION REVIEW

All subcontractors must submit a site-specific safety plan to our Project Manager for review before commencing work. The Commission Representative/Safety Manager reviews the safety program for adequacy in accordance with the PSSP.

5.4 SUBCONTRACTOR SITE-SPECIFIC SAFETY PLANS

At least 10 days before work begins, each subcontractor must submit a copy of their Site-Specific Safety Plan (SSSP) to the Project Manager for review. The Commission Representative/Safety Manager reviews the safety plan to ensure that it meets the requirements of the Commission Subcontractor Site-Specific

Safety Plan. (A template for the Commission Subcontractor's Site-Specific Safety Plan is in Appendix D.)

The subcontractor site-specific safety plan must address the following elements:

- Key Line Personnel Responsibilities
- Safety Policy
- Identification of Competent Persons
- Scope of Work Evaluation
- Risk/Exposure/Hazard Assessment
- Control Measures
- Safety Inspections/Audits
- Risk Mitigation Planning
- Compliance
- Written Progressive Disciplinary Program
- Hazard Correction policy
- Training and Instruction Policy
- Project Site Employee Orientation Program
- Employee communication System and policy
- Recordkeeping Policy
- Accident/Exposure and investigations policy
- Emergency Action Plan
- Site-Specific medical Emergency plan
- Hazard Communication Program
- Written Trenching and Shoring Plan (if applicable)
- Written 100% Fall Protection Plan
- Specific Written Plans as Required by Regulation and Applicable to this Project
- Daily Safety Huddle Plan

The plan must include all applicable elements of the Site-Specific Safety Plan and OSHA 29 CFR 1910/1926 Standards.

5.5 PRE-MOBILIZATION SAFETY MEETING

The Project Manager conducts the Pre-mobilization Safety Meeting on the first day of subcontractor mobilization in the field at the work site. The Pre-mobilization checklist used for the safety portion of this meeting is included in Appendix B. The meeting includes a review of the pre-bid site/area risk analysis and a walk through of the work area to locate items on the risk analysis checklist. The risk analysis checklist should also be used immediately preceding any critical task the subcontractor must undertake such as a "critical lift", a hazardous demolition task, etc.

SECTION 6 – CONSTRUCTION PHASE

6.1 SITE RISK ANALYSIS

Before work begins, the Project Manager leads a team that performs a risk analysis at each work site to identify potential hazards that require specific control measures. Potential hazards are listed below:

- Asbestos
- Confined Spaces
- Crane Set Up and Critical Lifts
- Excavations and Trenching
- Falls
- Fire
- Heavy Material Movement
- Industrial Hygiene
- Lead
- Marine Safety/Work over Water
- High Voltage
- Underground Utilities
- Traffic

6.2 FIVE HAZARD CONTROL MEASURES

Site hazards and hazards resulting from construction activities are controlled using one or more of the control measures listed below:

1. **Engineer/design to eliminate or minimize hazards.** A major component of the design phase is to select appropriate safety features to eliminate a hazard and render it fail-safe or provide redundancy using backup components.
2. **Guard the hazard.** Hazards that cannot be eliminated by design must be reduced to an acceptable risk level by safety guards or isolation devices that render them inactive.
3. **Provide warnings.** Hazards that cannot be totally eliminated by design or guarding are controlled through using a warning or alarm device.
4. **Provide special procedures or training.** When design, guarding, or warnings cannot eliminate hazards, subcontractors must develop procedures, training, and audits to ensure safe completion of work. Training cannot be a substitute for hazard elimination when life-threatening hazards are present.
5. **Provide personal protective equipment (PPE).** To protect workers from injury, through the use of PPE, such as hard hats, gloves, eye protection, life jackets, and other protective equipment with

the understanding that bulky, cumbersome, and heavy PPE is often discarded or not used, rendering this method ineffective without proper controls.

6.3 ACTIVITY HAZARDS ANALYSIS

We or our subcontractors are required to conduct an Activity Hazards Analyses (AHA) for all aspects of the work, when a hazard is considered an unusual risk or a significant risk. An Activity Hazards Analyses includes the following steps:

- Identify the task and break it down into steps
- Identify the hazards associated with each step
- Identify the specific hazard control measure used for each step in accordance with the order-of-precedence method of control

Project Managers can conduct a pre-mobilization inspection to determine the need for an AHA for high-hazard operations and critical tasks. The AHA form is in Appendix B of this safety plan. *(The list below should be customized to reflect the work to be performed on this site).*

- **Pre-mobilization inspection.** Conduct an initial site inspection for pre-job planning. The inspection should cover potential exposures such as the location of electrical lines, underground utilities, nearby structures, traffic conditions, site security needs, public exposures general liability, and other potential exposures.
- **Water, wastewater, and marine work.** Analyze work adjacent to, in, or over water (including lakes, canals, dams, treatment plants, water tanks, clarifiers, and reservoirs).
- **Traffic controls.** Plan traffic controls for delivery of equipment or materials and equipment operations. Control measures include warning signs, flagmen, traffic stoppage and control, and unloading procedures.
- **Material storage.** Consider where materials and equipment will be stored on site. Implement measures to protect against vandalism and theft. Also consider the hazards that may exist for workers when storing or retrieving materials.
- **Material handling.** Consider the size and weight of loads, how equipment will be used, how equipment is set up and protected, and safety and maintenance inspections of material handling and rigging equipment. Consider to employee training in use of the equipment and ergonomic issues when engaged in manual material handling activities.
- **Heavy equipment controls.** Evaluate the use of heavy equipment in operations such as site clearing, grading, excavation, or lifting. Controls should include equipment alarms, use of qualified operators, pre-use inspections, and OSHA regulatory requirements.
- **Fall protection.** Use fall protection when employees are working above the normal work surface level. Consider how and where ladders, scaffolding, work platforms, or lifts (including scissors or bucket lifts), roofing work, and leading edges are used. Evaluate protective measures such as Fall Protection Plans, use of personal fall arrest systems, and work surfaces for slip and fall hazards and protection
- **Steel erection.** Steel erection operations must comply with applicable OSHA regulations (1926.750) and the Steel Erection Negotiated Rule Advisory Committee (SENAC).

- **Personal protective equipment (PPE).** Consider operations where PPE is required and the type required, e.g., eye, head, foot, respiratory, hearing and hand protection, and types of special protective clothing.
- **Portable hand and power tools.** Evaluate tools to be used and the ways that workers can be protected from the hazards associated with their use. Consider tool maintenance requirements, electrical requirements, and use of ground fault circuit interrupters, grounding, extension cords, tool inspection procedures, and employee training.
- **Onsite traffic.** Internal traffic control plans should include ways to restrict the number of vehicles on the site, the flow of vehicles through the site, haul roads, speed controls, subcontractor employee parking areas, merging of site traffic with local vehicle traffic, pedestrian controls in traffic zones, access by emergency vehicles and operator controls.
- **Employee training.** Review the safety training needs of employees. Training should include initial site safety orientations and hazard communication training. Some operations (e.g., excavation, blasting, scaffold erection, tunneling, confined space, heavy equipment operations, and hazardous plant process operations) may require special training that should be checked and evaluated.
- **Confined spaces.** Confined space work requires special consideration, evaluation, and controls. Each space should be reviewed for regulatory compliance.
- **Tunneling.** Tunneling has specific requirements that involve the local Mine Safety and Health Administration officials. Project Managers must contact their Safety Manager to ensure that tunneling hazards are properly addressed.
- **Crane operations.** All lifts must be planned in accordance with the limitations of cranes used and any special requirements for operations, maintenance, and heavy lifting.
- **Excavations and trenching.** These activities require complete analysis of existing underground exposures, soils, sloping and shoring methods, equipment, and engineering if the depth of a trench or excavation exceeds four feet. An Activity Hazards Analysis is recommended for all trenching operations.
- **Concrete formwork and placement.** Adequate access and egress to elevated concrete work is essential to the safe and quality placement of concrete work. Work involving concrete should consider protective measures such as staging, platforms, handrails, and other passive forms of employee protection.
- **Process safety management.** At process sites where highly hazardous chemicals are stored or used, comply with special considerations and OSHA process safety management regulations.
- **Mechanical, electrical, and piping.** Evaluate all work associated with the installation, repair and maintenance of mechanical, piping and electrical work for interferences, lockout/tag out, line break procedures, and applicable customer requirements.

Contractor will complete an Activity Hazard Analysis (AHA) for all hazardous activities. The AHA must be provided to the Commission Representative for review at least seven (7) days before the work for the AHA begins.

6.4 **THREE WEEK SAFETY LOOK AHEAD SCHEDULE**

18B

Contractor shall submit a Three Week Safety Look Ahead Schedule. It must address the exposures and potential hazards associated with planned work and state the mitigation measures/abatement protocols required for the Three Week Look Ahead Schedule. The Schedule shall be submitted to the Commission Representative each week.

6.5 CONSTRUCTION SITE INSPECTION

The construction site inspection conducted by the Project Superintendent is designed to identify and correct unsafe acts or conditions while work is in progress. The Project Superintendent responsible for the work or the Safety Manager must conduct routine construction safety inspections. The original inspection documentation should be on file in the job site office. The Construction Safety and Health Inspection Checklist is included in Appendix B.

The Superintendent or Safety Manager inspecting the work area and making daily observations and notes of noncompliance should include findings/corrective actions on their daily construction report. Items found to be out of compliance must be assigned corrective action and tracked to completion.

6.6 DAILY SITE WALK CHECKLIST

The Project Superintendent conducts a daily safety site walk using the Construction Safety and Health Inspection Checklist to identify problem areas. Items found to be out of compliance must be assigned corrective action and tracked to completion.

6.7 SAFETY AND HEALTH ENFORCEMENT

Name of Contractor and our subcontractors enforce all applicable requirements of OSHA 29 CFR1910 and 1926 as well as EM 385.1, where applicable. Written progressive disciplinary system regarding safety violations must be available for review in order to document the actions taken to control hazards on this job site. A safety violation form can be located in Appendix B of this safety plan.

6.8 NOTICE OF VIOLATION OF SAFETY AND HEALTH REGULATIONS

The Contractor uses a formal Notice of Subcontractor Violation of Safety and Health Regulations Program to ensure that violations are issued as the result of an "immediately dangerous to life and health" (IDLH) situation or when the subcontractor repeatedly fails to comply with safety and health requirements.

A sample notice of violation included in Appendix B can be used to document poor performance. It requires a response from our subcontractor senior manager.

6.9 COMPETENT FIRST AID PERSON

At least one competent person must be available at the work site at all times to render First Aid. This person must have a valid certificate in First Aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent verifiable training program. First Aid supplies must be accessible for immediate use and in sufficient quantity to handle common First Aid incidents.

To meet this requirement, we have chosen to rely on the local EMT provider. The Superintendent has contacted the responding EMT and they visited this job site so that they are familiar with location and conditions in case of an emergency response.

SECTION 7 – CONSTRUCTION SAFETY TRAINING

7.1 PROJECT SAFETY ORIENTATION

The Project Manager/Safety Manager conducts site-specific orientation for all new staff and subcontractor management personnel.

Orientation includes a review of the Project-Specific Safety Plan and regulatory reference material, including:

- Project overview, work sequencing, planning, and scheduling
- Applicable 29 CFR1910 General Industry and 1926 Construction Regulations and others as required
- PBC Safety Requirements

Subcontractors must conduct similar orientations for their staff and craft employees and must document all orientations using an employee acknowledgement form which can be found in Appendix B of this plan.

7.2 ZERO INCIDENT TECHNIQUES

Consistent with our safety program, all managers and supervisors, including subcontractor personnel, must complete specific safety training as required. Training addresses the SHARP (Safety, Health and Risk Prevention) principles.

7.3 DAILY HUDDLE AND SAFETY PLANNER

Our Project Superintendent conducts daily safety huddles with craft foremen to review the day's work and to remind them of safe work procedures established for the tasks at hand. Safety huddles are informal and brief, usually 5 minutes, and all workers must participate. Daily Safety Planning enable foremen and employees to formally document safety huddle participation as well as the day's activities, associated risks, and relevant control measures.

7.4 WEEKLY TOOLBOX SAFETY MEETINGS

We conduct safety meetings at the beginning of each week. These meetings include topics relevant to upcoming work and may include reviews of recent incidents. The Project Superintendent/Safety Manager documents safety meetings and attendance which are maintained on site.

7.5 ACTIVITY HAZARDS ANALYSIS TRAINING

When the Activity Hazards Analysis is complete, the Project Superintendent or subcontractor foreman conducts a training session with all employees involved with the task. The training may be informal and at the site where the task is performed. Employees should be given an opportunity to provide input regarding task steps, hazards identified, and appropriate control measures.

The Project Superintendent/Safety Manager documents and maintains the Activity Hazards Analyses and training sessions. A sample AHA Training record is located in Appendix B.3.

7.6 REGULATORY TRAINING PROGRAMS

OSHA regulations require specific training in certain circumstances. Based on the scope of work and meetings with regulatory officials, the following training topics are provided on the project:

- General Provisions
- First Aid
- Emergency response
- Respiratory protection
- Signaling
- Process safety management
- Powder-actuated tools
- Gas welding and cutting
- Confined spaces
- Lock Out/Tag Out
- Fire protection
- Fall protection
- Hazard communication

The Project Superintendent/Safety Manager organizes the required training. Instructors are typically safety professionals with expertise and/or certifications necessary to provide training. *(Provide further description)*

7.7 OSHA OUTREACH PROGRAMS

Name of Contractor uses qualified instructors to conduct OSHA 10-/30-hour construction safety training. All project employees must complete the 10-hour course, and supervisory staff must complete the 30-hour course. The training must be completed during the employee's first month on the project. Participants successfully completing the course

Receive a certificate of completion from OSHA. *(This section also describes the contractor's safety training program.)*

7.8 SPECIALIZED TRAINING AND ORIENTATIONS

Project personnel who receive specialized training on PBC safety rules and requirements as well as the unique tools, equipment, and procedures used to perform the work can be documented on the form which is included in Appendix B.15.

SECTION 8 – RECORDKEEPING AND POSTING

Name of Contractor and our subcontractors must comply with the recordkeeping requirements of OSHA:

- OSHA 300 Logs Medical treatment and follow-up
- Cranes maintenance and inspection
- Heavy equipment maintenance and inspection
- Fall protection
- Safety training
- Site safety inspections/audits

OSHA posters are located in conspicuous places such as the main bulletin board located in the job site office.

The Contractor shall keep the Competent Person Forms and Operator Certifications on site. All files will be kept current.

SECTION 9 – SAFETY AND HEALTH REQUIREMENTS

9.1 SAFETY AND HEALTH REQUIREMENTS

A Competent Person and Activity Hazards Analysis requirements matrix applicable to this project is included in this section. Based on the most recent risk assessments, the Project Manager/Safety Manager updates the listed topics periodically. Training and other requirements are updated in this PSSP as required. This matrix provides an overview of these requirements. Name of Contractor and our subcontractors are responsible for training their respective employees and for complying with all project safety training requirements.

Competent Person and Activity Hazards Analysis Requirements

Safety and Health Requirement	OSHA Regulation	EM 385-1-1 Regulation	Competent/Qualified Person	Training Required	Written Plan and AHA Required
General Safety and Health	1926.20	01.A	Yes	Yes	Yes
Safety Training	1926.21	01.B.01	Yes	Yes	Yes
Confined Spaces	1926.21, 1910.147	06.01	Yes	Yes	Yes
Confined Space Permit System	See above	06.01	Yes	Yes	Yes
First Aid and Medical	1926.23, 50	03.A	Yes	Yes	Yes
Fire Protection and Prevention	1926.24, 150-155, 352	09.A	Yes	Yes	Yes
Housekeeping	1926.25	14.C	N/A	N/A	N/A
Illumination	1926.26, 56	07.A	Recommended	N/A	N/A
Sanitation	1926.27, 51	02.A	N/A	N/A	N/A
Personal Protective Equipment	1926.28, 95-98, 100-107	05.A	Yes	Yes	Yes
Acceptable Certifications	1926.29		Yes	Yes	Yes
Incorporation by Reference	1926.31	Preamble	N/A	N/A	N/A
Emergency Employee Action Plans	1926.35	01.E	Recommended	Yes	Yes
Noise Exposure	1926.52	05.C	Yes	Yes	Yes
Radiation Protection	1926.53, 54	06. E&F; 28.A.02	Yes	Yes	Yes
Gases, Vapors, Dusts and Mists	1926.1926.55		Yes	Yes	Yes
Ventilation	1926.57, 353		Recommended	Yes	Yes
Hazard Communication	1926.59	1.B.06	Yes	Yes	Yes

Exhibit 9-1 – Competent Person and Activity Hazards Analysis Requirements (Contd)

Safety and Health Requirement	OSHA Regulation	EM 385-1-1 Regulation	Competent/Qualified Person	Training Required	Written Plan and AHA Required
Process Safety Management	1926.64 1910.119		Yes	Yes	Yes
Hazardous Waste Operations and Emergency Response	1926.65 1910.120	28.A	Yes	Yes	Yes
Accident Prevention Signs and Tags	1926.200	08.A	N/A	N/A	N/A
Signaling	1926.201	08.B	Recommended	N/A	Yes
Barricades	1926.202		N/A	N/A	N/A
Material Storage	1926.250	14.B	N/A	Yes	Yes
Rigging	1926.251	15.A	Yes	Yes	Yes
Waste Disposal	1926.252	14.D	Yes	Yes	Yes
Tools	1926.300-307	13.A	N/A	N/A	Yes
Gas Welding and Cutting	1926.350	10.A	Recommended	Yes	Yes
Arc Welding	1926.351	10.E	Recommended	Yes	Yes
Electrical	1926.400-415	11.E	Yes	Yes	Yes
General Electrical	1926.416	11.A	Yes	Yes	Yes
Lockout Tagout	1926.417, 1910.147	12.A	Yes	Yes	Yes
Lockout Tagout Permit System	See above	12.A	Yes	Yes	Yes
Maintenance of Electrical Equipment	1926.431	11A	Yes	Yes	Yes
Environmental Deterioration of Electrical Equipment	1926.432		Yes	Yes	Yes
Batteries/Battery Charging Equipment	1926.441	11.E	N/A	Yes	Yes
Scaffolding	1926.450-454	22.A	Yes	Yes	Yes
Aerial Lifts	1926.453	22.J and K	Yes	Yes	Yes
Fall Protection	1926.500-503	21.A	Yes	Yes	Yes
Cranes, Derricks, Hoists, Elevators and Conveyors	1926.550	16.A	Yes	Yes	Yes
Motor Vehicles, Mechanized Equipment	1926.600-603	18.A	Yes	Yes	Yes
Powered Industrial Trucks (forklifts)	1910.178		Yes	Yes	Yes
Site Clearing	1926.604	31.A	N/A	Yes	Yes
Marine Operations and Equipment	1926.606	16.F	Yes	Yes	Yes

Exhibit 9-1 – Competent Person and Activity Hazards Analysis Requirements (Contd)

Safety and Health Requirement	OSHA Regulation	EM 385-1-1 Regulation	Competent/Qualified Person	Training Required	Written Plan and AHA Required
Excavations	1926.650-652	25.A	Yes	Yes	Yes
	N/A	N/A	Yes	Yes	Yes
Concrete and Masonry Construction	1926.700-706	27.A	Yes	Yes	Yes
Steel Erection	1926.750-761 and SENRAC		Yes	Yes	Yes
Underground Construction	1926.800	26.A	Yes	Yes	Yes
Caissons	1926.801	26.H	Yes	Yes	Yes
Cofferdams	1926.802		Yes	Yes	Yes
Demolition	1926.850-860 inclusive	23.A	Yes	Yes	Yes
Power Transmission and Distribution	1926.950-960 inclusive	11.H	Yes	Yes	Yes
Rollover Protective Structures; Overhead Protection	1926.1000-1003 inclusive		N/A	N/A	Yes
Stairways and Ladders Scope	1926.1050	21.A	N/A	Yes	Yes
Stairway/Ladder General Requirements	1926.1051		Yes	Yes	Yes
Stairways	1926.1052	21.E	<i>Recommended</i>	Yes	N/A
Ladders	1926.1053	21.D	Yes	Yes	Yes
Ladder/Stair Training	1926.1060		Yes	Yes	Yes
Internal Traffic Control	N/A	8.D	N/A	Yes	Yes
Traffic Movement Restriction Times	N/A	8.C	N/A	Yes	Yes
Line Breaking	1910.119 and 1926.54		Yes	Yes	Yes
Major Material Movements	N/A	N/A	N/A	Yes	Yes
Right-of-way Restrictions	N/A	N/A	N/A	Yes	Yes
Bicycles/Golf Carts	N/A	18.D	N/A	Yes	N/A
IIPP/SSPP	Cal 3203	Cal 3203	Yes	Yes	Yes

APPENDICES

A. REQUIRED WRITTEN ES&H PLANS

B. HEALTH AND SAFETY FORMS

C. OSHA INSPECTIONS AND LOGS

D. SUBCONTRACTOR SSSP TEMPLATE

APPENDIX

A. REQUIRED WRITTEN ES&H PLANS

1. Confined Space Entry Plan
2. Fall Protection Plan
3. Hazard Communication Plan
4. Hazardous Materials Storage Plan
5. Temporary Utilities Plan
6. Storm Water Management Plan
7. Pollution Prevention Plan

APPENDIX B. HEALTH AND SAFETY FORMS

Include copies of your Safety and Health Forms.

Sample Safety and Health Forms

1.	Accident Report Form	p.32-33
2.	Activity Hazards Analysis (AHA)	p. 34
3.	Competent Person Acknowledgement Form	p. 35
4.	Construction Health & Safety Inspection Checklist	p. 36
5.	Employee Acknowledgement Form	p. 37
6.	Near-Miss Report Form	p. 38
7.	Notice of Non-Compliance	p. 39
8.	Notice of Health and Safety Violations	p. 40
9.	OSHA First Aid List	p. 41
10.	Pre-Construction Safety Meeting	p. 42
11.	Pre-Mobilization Safety Meeting	p. 43
12.	Project Risk Review Checklist	p. 44
13.	Risk Mitigation Two Week Look Ahead	p. 45
14.	Safety Meeting Minutes	p. 46
15.	Specialized Training and Orientation	p. 47
16.	Subcontractor Pre-Qualification Scorecard	p. 48-49
17.	Superintendent/Foreman/Inspector Daily Checklist	p. 50

NAME OF CONTRACTOR

Activity Hazards Analysis

Project Name & Number:		AHA No.		Date:	
Location:		Contractor:			
Required Personal Protective Equipment				Analysis by:	
		Superintendent/Competent Person		Reviewed by:	
Work Operation:				Approved by:	
Work Activity	Potential Hazards	Preventive or Corrective Measures		Inspection	

Training Requirements:

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with the Daily Safety Huddle.

Competent Person Acknowledgment Form

Definition

A competent person is a person who has the ability to recognize existing and predictable hazards and has the authority to correct them.

Responsibility

The designated competent person is responsible for recognizing and correcting safety risks/hazards. This person has the authority to stop work in the event of any potential safety concern on the job site. This representative is considered the contact person for the Project Manager/Superintendent on this Project.

This form must be completed by the supervisor/foreman of contractor's designated competent person(s). Where a subcontractor is responsible for multiple crafts, it may be necessary to maintain additional designated competent persons and forms. This form should be completed and submitted to the Project Manager/Superintendent prior to beginning this work and updated any time there is a change in the designated representative(s).

ACKNOWLEDGMENT

I, _____ representing, _____
Contractor Supervisor/Foreman Name of Employer
assigned _____ to be the competent person in the areas indicated and I
Name of Competent Person

acknowledges that this individual has been thoroughly trained and is experienced in hazard recognition and has the authority to stop work and correct hazards in the event of a potential hazardous or imminent danger situation.

Supervisor/ Foreman (Signature)

Date

I, _____ acknowledge that I have been thoroughly trained and have the experience to
Competent Person (Signature)
perform the duties as the _____ competent person in the areas marked below and
Name of Employer

I understand that I have the responsibility and authority to correct hazards and to stop work in the event of a potential hazardous or imminent danger situation.

_____ Asbestos	_____ Hearing Protection	_____ Welding/Cutting
_____ Respiratory Protection	_____ Scaffolding	_____ Slings
_____ Cranes/Derricks	_____ Electrical	_____ Confined Space
_____ Fall Protection	_____ Ladders	_____ Excavations/Trenches
_____ Demolition	_____ Mechanical Demolition	_____ First Aid/CPR
_____ Underground Const.	_____ Material/Personnel Hoists	_____ Concrete/Forms/Shoring
_____ Slab Lift Operations	_____ Bolting/Riveting/Fitting	_____ Other:

NAME OF CONTRACTOR

Construction Health and safety Inspection Checklist

Project: R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE Date: _____

Name: _____

Time: _____

Any items that have been found deficient must be corrected before work or use.

This checklist includes, but is not limited to, the following:

Description	Yes	No
Safe Access and Workspace		
Are safe access and adequate space for movement available for:		
Emergencies		
Work area		
Walkways and passageways		
Are ladders, stairways, and elevators properly located and functioning?		
Is protection provided for floor and roof openings?		
Is overhead protection provided for all areas of exposure?		
Is lighting adequate?		
Planning Work for Safety		
Are employees provided with all required protective equipment?		
Have other contractors and trades been coordinated with to prevent congestion and avoid hazards?		
Is all temporary flooring, safety nets, and scaffolding provided where required?		
Utilities and Services Identification		
High-voltage lines		
Have all been identified by signs?		
Have high-voltage lines been moved or de-energized, or barriers erected to prevent employee contact?		
Sanitary Facilities		
Drinking water		
Are toilet facilities adequate?		
Work Procedures – Materials Handling		
Is material handling space adequate?		
Is material handling equipment adequate and proper?		
Is material handling equipment in good condition?		
Other (e.g., tunnels, excavations, shafts)		

Comments:

NAME OF CONTRACTOR

Employee Acknowledgment Form

Name of Employee: _____

Subject: _____

Project: R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE

Date of hire/assignment: _____

I, _____, hereby certify that I have received training as described above in the following areas:

- ☐ The potential occupational hazards in general in the work area and associated with my job assignment.
- ☐ General safety requirements indicate the safe work conditions, safe work practices and personal protective equipment required for my work.
- ☐ The hazards of any chemicals to which I may be exposed and my right to information contained on material safety data sheets for those chemicals, and how to understand this information.
- ☐ My right to ask questions, or provide any information to the employer on safety either directly or anonymously without any fear of reprisal.
- ☐ Disciplinary procedures the employer will use to enforce compliance with general safety requirements.

I understand this training and agree to comply with general safety requirements for my work area.

Employee Signature

Date

NAME OF CONTRACTOR

Near-Miss Report Form

Facility/Project: R20CN01 – WORK PLATFORMS FOR RIVERSIDE
CARHOUSE

Date: _____

Contractor Name: _____

Location: _____

Attention: _____

This form documents a near-miss incident, briefly described as:

on (date) _____, reported by _____

This incident involved the following:

Confined Space Entry	_____	Lockout/Tagout	_____	Hot Work	_____	Personal Protective Equipment	_____
Knowledge of the environment	_____	Awareness of warning alarms	_____	Evacuation routes	_____	Back-up Alarms	_____
Assembly locations	_____	Fall Protection	_____	Scaffolding	_____	Environmental/Hazardous Material Storage	_____
Trenching	_____	Safe Work Practices	_____	Security Practices	_____	Office/Facility	_____

Other: _____

This incident occurred at the following locations: _____

at the following times _____ and dates _____

The name of the employees was/were _____

under the supervision of _____

Immediate corrective action included: _____

NAME OF CONTRACTOR

Notice of Contractor Noncompliance with Safety and Health Regulations

Under conditions of this enforcement procedure check all items that apply. Notices of Noncompliance with H & S Regulations can result in termination of the contract.

- ☐ 1. You are being notified of this violation and should take corrective action to prevent a reoccurrence. The corrective action shall be documented and submitted to the PMO Project Manager or representative immediately.
- ☐ 2. You must submit a plan for compliance to the Project Supt. within one day of receipt of this letter. The compliance plan must include the means or methods of compliance and the date that the requirements for compliance will be completed. Failure to comply will result in disciplinary action against your Company.
- ☐ 3. You are required to review the stated procedures with the Project Supt. Work may not commence on the site until the corrective action is complete and the procedure is fully understood by your workers.
- ☐ 4. You are required to review the stated procedures with the PMO Project Manager or representative. Work may not commence on the site until the review is complete and you **must** confirm formally the disciplinary action to be taken against the supervisor and employees.
- ☐ 5. All work on the site will stop until the PMO Project Manager/ representative reviews all the facts and determines if the contract between the parties will be terminated.

Sincerely,

Project Superintendent

Construction Company

cc: PMO Project Manager
PBC Project Manager
Program Safety Manager

NAME OF CONTRACTOR

NOTICE OF HEALTH AND SAFETY VIOLATIONS

Date: Project: R20CN01 – WORK
PLATFORMS FOR RIVERSIDE
CARHOUSE

Location:

Contractor:
Address:

T.
F.
Supt.

1. Instructions are written in Red in this template. Please delete upon writing Notice of Violation
2. Safety Violations listed can be edited electronically as needed.
3. OSHA Standard need not be quoted, just referenced.

This letter officially notifies you that the following Safety Violations were noted during our job site inspection.

Assembly locations		Evacuation Routes		Ladders & Stairways	
Awareness of Warning Alarms		Fall Protection		Scaffolding	
Backup Alarms		Hot Work		Security Practices	
Confined Space Entry		PPE		Trenching	
Environmental/Hazardous Material Storage		Lockout/Tag Out		Other	
		Safe Work Practices		Other	

Violation Descriptions:

1. Violation
(OSHA Std.)
2. Violation
(OSHA Std.)

Please respond in writing within ____ days after the receipt of this Notice as to the disposition of these violations and the corrective actions implemented to ensure that a safe workplace is maintained at all times.

NAME OF CONTRACTOR

OSHA First Aid List

1904.7 (b)(5)(ii) What is "first aid"?

For the purposes of Part 1904, "first aid" includes the following:

A	Using a nonprescription medication at nonprescription strength (for medications available in both prescription and nonprescription form, a recommendation by a physician or other licensed health care professional to use a nonprescription medication at prescription strength is considered medical treatment for recordkeeping purposes)
B	Administering tetanus immunizations (other immunizations, such as hepatitis B or rabies vaccine, are considered medical treatment)
C	Cleaning, flushing, or soaking wounds on the surface of the skin
D	Using wound coverings such as bandages, Band-Aids™, or gauze pads; or using butterfly bandages or Steri-Strips™ (other wound-closing devices such as sutures or staples are considered medical treatment)
E	Using hot or cold therapy
F	Using any non-rigid means of support, such as elastic bandages, wraps, or back belts (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for recordkeeping purposes)
G	Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards)
H	Drilling a finger- or toenail to relieve pressure, or draining fluid from a blister
I	Using eye patches
J	Removing foreign bodies from the eye using only irrigation or a cotton swab
K	Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs, or other simple means
L	Using finger guards
M	Using massage (physical therapy or chiropractic treatment are considered medical treatment)
N	Drinking fluids to relieve heat stress

This is a complete list of all treatments considered first aid for Part 1904 purposes.

NAME OF CONTRACTOR
Preconstruction Safety Meeting

Date: _____ Subcontractor Representative: _____ Phone: _____ Subcontractor Safety Rep: _____ Phone: _____	Project/Location: R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE PBC Project Manager: _____ Phone: _____ PBC Safety Manager: _____ Phone: _____
------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The following items were identified and reviewed with the subcontractor.

Health & Safety	Medical
Site-Specific Safety Plans/Model Program _____	Substance Abuse Screening _____
Competent/Qualified Person Documentation _____	Emergency Procedures _____
Safety Audits/Inspections _____	Site Security _____
Subcontractor Responsibilities _____	Smoking Policy _____
Site Orientation Requirements _____	Medical Services Requirements _____
Premobilization Safety Meeting/Date _____	Treatment Locations/Addresses/Phone List _____
Crane Inspection Certification _____	Other _____
Personal Protective Equipment (PPE) _____	
Environmental Hazards _____	
Other _____	

Additional Notes/Comments:

NAME OF CONTRACTOR

Pre-Mobilization Safety Meeting

Date: _____ Project/Location: R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE

Project Superintendent: _____

PBC Safety Director: _____ Subcontractor(s) : _____

The following project site safety, health and security requirements, procedures, and hazards have been identified and reviewed with the above contractors.

Activity Hazards Analysis	Spray Painting	
Competent/Qualified Person	Personal Protective Equipment	
Hazardous Materials/Waste/MSDS	Site Protective Measures	
Vehicle/Heavy Equipment	Cranes/Hoists/Annual Inspection Certs.	
Lockout/Tag out	Cables/Telephone/OH Power Lines	
Electrical	Excavations/Trenching	
Fire Protection	Site Security/Visitor Control/Public Exposure	
Hot Work/Welding/Cutting	Utility Disruption	
Fall Protection/Guardrails/ Scaffolding/Ladders	Permits (Excavation/Scaffolding/Demolition/Traffic/ Confined Space/etc.)	

Project Safety Comments & Concerns:

Other Attendees:

Name	Title	Company

Name of Contractor

Project Risk Assessment

Date: Project or Location: R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE Name:

Risk/Hazard	Detail	Present	Risk/Hazard	Detail	Present
Occ. Health Exp.	PCB, Lead, Asbestos	<input type="checkbox"/>	Ladders/Stairs	Cleats, Rungs	<input type="checkbox"/>
	UXO	<input type="checkbox"/>		Tied Off	<input type="checkbox"/>
	Airborne Contaminants (dust, mists, fumes)	<input type="checkbox"/>	Utility Disruption	U/G Locates	<input type="checkbox"/>
	Bio. Haz./Blood borne P	<input type="checkbox"/>		O/H Distribution	<input type="checkbox"/>
	Chemical Hazards	<input type="checkbox"/>	Signs, Signals, Barricades	Traffic Control	<input type="checkbox"/>
Process Safety/ Haz. Com	Work is on or adjacent to operations involving listed highly hazardous chemicals	<input type="checkbox"/>		MUTCD/Flagmen	<input type="checkbox"/>
	Haz. Com/MSDS	<input type="checkbox"/>		Signs/Tags	<input type="checkbox"/>
Confined Space	Permit Required	<input type="checkbox"/>	Underground/ USTs	Caissons/Cofferdams	<input type="checkbox"/>
	Entry Supv.	<input type="checkbox"/>		Tunnels/Shafts	<input type="checkbox"/>
	Atmos. Test./Alarm	<input type="checkbox"/>		Trench/Excavation	<input type="checkbox"/>
	Rescue	<input type="checkbox"/>		UST Removal	<input type="checkbox"/>
Energy Control	LOTO/Isolation	<input type="checkbox"/>	Hot Work	Torching, Welding,	<input type="checkbox"/>
	Inspection Proc.	<input type="checkbox"/>		Soldering, Brazing	<input type="checkbox"/>
Hand/Power Tools	Heads/Handles	<input type="checkbox"/>	PPE	Hot Work Permit	<input type="checkbox"/>
	Cords/Plugs/Recept.	<input type="checkbox"/>		Hard Hats	<input type="checkbox"/>
	GFCI	<input type="checkbox"/>		Safety Glasses	<input type="checkbox"/>
	Guards/Hoses	<input type="checkbox"/>		Hearing Protection	<input type="checkbox"/>
	Powder Actuated	<input type="checkbox"/>		Respirators/SCBA	<input type="checkbox"/>
Cranes-Mobile, Bridge, Tower, Derricks/Hoists	Rigging, Hooks, Shackles	<input type="checkbox"/>	Common Hazards	Protective clothing	<input type="checkbox"/>
	Load Capacity	<input type="checkbox"/>		Fall Protection	<input type="checkbox"/>
	Hand/Radio Signals	<input type="checkbox"/>		Housekeeping	<input type="checkbox"/>
	Cert. Operators	<input type="checkbox"/>		Falling Objects	<input type="checkbox"/>
	Inspection/Maint.	<input type="checkbox"/>		Protruding Objects	<input type="checkbox"/>
Powered Industrial Trucks, Aerial Lifts	Scaffolds	Guardrails, C.Bracing Platforms, Ladders	Fire Protection/ Life Safety	Special Hazards/ Waste	<input type="checkbox"/>
				Sanitation	<input type="checkbox"/>
				Handling, removal or site storage	<input type="checkbox"/>
				Debris/rubbish	<input type="checkbox"/>
				Extinguishers	<input type="checkbox"/>
				Evac. Routes	<input type="checkbox"/>

NOTES/COMMENTS:

NAME OF CONTRACTOR

Risk Mitigation 2 Week Look-Ahead

Safety plan for
week ending: _____

Subcontractor: _____

Project/
Location: _____

R20CN01 – WORK PLATFORMS
FOR RIVERSIDE CARHOUSE

Meeting date: _____

Plan
Prepared by: _____

Dated: _____

Next Two Weeks Scope of Work:

Identified Risks/Exposures/Hazards:

Control Measures:

Additional Activity Hazards Analysis Required:

Subcontractors Mobilizing/Demobilizing:

Audit/Inspections Scheduled:

Competent Person Changes:

Planned Orientation/Training :

Recommendations/Comments/Concerns:

Note: This information should be incorporated into the Safety Meeting Minutes.

NAME OF CONTRACTOR

Safety Meeting Agenda/Minutes

Date & Location:

Meeting Start Time:

Meeting End Time:

Agenda:

Review of minutes of last safety meeting: Approved? Yes No

Corrections:

Unfinished business from last meeting:

Any hazards or safety concerns reported during this time period? Status of any corrective action reports?

Any accident investigations conducted since the last meeting? Describe identification of the cause and corrective action(s)?

Is your accident and illness prevention program working? Yes No

If no, describe any recommendations to improve it.

Is your safety awareness program working? Yes No

If no, describe any recommendations to improve it

What other safety-related topics were covered in this meeting?

Health and safety concerns for the next period?

Who attended this meeting?

Minutes prepared by:

Next meeting date and location:

NAME OF CONTRACTOR

Specialized Training and Orientation

Description	Attendees	Schedule
Client rules and safety requirements	All workers assigned to the site	Half-hour training session, provided to new employee on the first day of work at the site.

NAME OF CONTRACTOR
Subcontractor Qualification Scorecard

Subcontractor Name: _____

Please answer the following questions.

1. ☐ Yes ☐ No Do you have a written safety program? If yes, provide a copy of the table of contents and a copy of your firm's policy statement.
2. ☐ Yes ☐ No Do your safety procedures comply with government agency requirements? If yes, provide name of agency/agencies.

3. ☐ Yes ☐ No Do you require and use site-specific safety plans?
4. ☐ Yes ☐ No Does your worker's compensation carrier provide site audits on a regular basis?
5. ☐ Yes ☐ No Does your company have a written drug/substance abuse policy?
6. ☐ Yes ☐ No Do you have an orientation program for new hires?
7. ☐ Yes ☐ No If you have an orientation program for new hires, does it include subcontractors?
8. ☐ Yes ☐ No Do you require subcontractors to submit safety plans?
9. ☐ Yes ☐ No Do you hold site safety meetings for field supervisors?
How often? Weekly ☐ Biweekly ☐ Monthly ☐ Daily ☐
10. ☐ Yes ☐ No Do you hold craft toolbox safety meetings?
How often? Weekly ☐ Biweekly ☐ Monthly ☐ Daily ☐
11. ☐ Yes ☐ No Have you been inspected by OSHA or received any OSHA citations in the past 3 years? If yes, provide an attachment describing the outcome of the inspection along with copies of citations received. Provide a description of the actions taken to abate the citations as an attachment to this application. Respond to any open citations shown on the OSHA website (www.osha.gov).
12. Identify below by name, phone number, and title the person in your firm directly responsible for the firm's Safety Program management and attach a copy of his or her resume to this application.
13. How do you conduct project safety inspections, and how often are they performed?

14. Describe your firm's program to motivate, encourage, and monitor safe work performance.

NAME OF CONTRACTOR
Subcontractor Qualification Scorecard (Contd)

OSHA INFORMATION:

<p>*Please use your OSHA 200 Log and/or 300 Log to fill in the number of injuries and illnesses for the last 3 years</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%;">Year</td> <td style="width: 10%; text-align: center;">1</td> <td style="width: 10%; text-align: center;">2</td> <td style="width: 10%; text-align: center;">3</td> <td style="width: 35%;"></td> </tr> <tr> <td colspan="5" style="height: 40px;"></td> </tr> </table> <p>Number of lost/restricted workday cases (Totals OSHA 200 Log, columns 2 and 9; Totals OSHA 300 Log, columns K and L). _____</p> <p>Number of recordable cases without restricted activity or lost workdays (Totals OSHA 200 Log, columns 6 and 13; Totals OSHA 300 Log, column I and J). + _____</p> <p>Number of fatalities (Totals OSHA 200 Log, columns 1 and 8; Totals OSHA 300 Log column G). + _____</p> <p>Total OSHA Log (A) _____</p>	Year	1	2	3							<p>Total employee hours worked in the last 3 years (do not include any non-work time, even though paid)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%;">Year</td> <td style="width: 65%;">Hours (B)</td> </tr> <tr> <td style="text-align: center;">1</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">2</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">3</td> <td>_____</td> </tr> </table> <hr/> <p>Recordable Injury Frequency Rate</p> <p>Multiply total for each year (A) x 200,000 and divide by total employee hours for that year (B)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"><u>A x 200,000</u></td> </tr> <tr> <td colspan="2" style="text-align: center;">B</td> </tr> <tr> <td style="width: 35%;">Year</td> <td style="width: 65%;">Rate</td> </tr> <tr> <td style="text-align: center;">1</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">2</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">3</td> <td>_____</td> </tr> </table> <hr/> <p>Experience Modification Rate (EMR)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%;">Policy Year</td> <td style="width: 65%;">EMR</td> </tr> <tr> <td style="text-align: center;">1</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">2</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">3</td> <td>_____</td> </tr> </table>	Year	Hours (B)	1	_____	2	_____	3	_____	<u>A x 200,000</u>		B		Year	Rate	1	_____	2	_____	3	_____	Policy Year	EMR	1	_____	2	_____	3	_____
Year	1	2	3																																				
Year	Hours (B)																																						
1	_____																																						
2	_____																																						
3	_____																																						
<u>A x 200,000</u>																																							
B																																							
Year	Rate																																						
1	_____																																						
2	_____																																						
3	_____																																						
Policy Year	EMR																																						
1	_____																																						
2	_____																																						
3	_____																																						

Are the following accident records and accident summaries kept? How often are they recorded?				
	No	Yes	Monthly	Annually
Accidents totaled for the entire company	_____	_____	_____	_____
Accidents totaled by project	_____	_____	_____	_____

The Applicant shall maintain records of such evaluations and make them available for review and approval of Parsons representatives at all reasonable times should Applicant be awarded a contract based on this application.

By submitting this application, the Applicant agrees to use the above criteria and this form when selecting lower tier subcontractors.

Name of Contractor

Superintendent Daily H & S Checklist

Project: R20CN01 – WORK PLATFORMS FOR RIVERSIDE CARHOUSE

Date: _

Name: _____

Time: _

Any items that have been found deficient must be corrected before work or use.
This checklist includes, but is not limited to, the following:

	Yes	No
<i>Safe Access and Workspace</i>		
Are safe access and adequate space for movement available for:		
Emergencies		
Work area		
Walkways and passageways		
Are ladders, stairways, and elevators properly located and functioning?		
Is protection provided for floor and roof openings?		
Is overhead protection provided for all areas of exposure?		
Is lighting adequate?		
<i>Planning Work for Safety</i>		
Are employees provided with all required protective equipment?		
Have other contractors and trades been coordinated with to prevent congestion and avoid hazards?		
Is all temporary flooring, safety nets, and scaffolding provided where required?		
<i>Utilities and Services Identification</i>		
High voltage lines		
Have all been identified by signs?		
Have high voltage lines been moved or de-energized, or barriers erected to prevent employee contact?		
<i>Sanitary Facilities</i>		
Drinking water		
Are toilet facilities adequate?		
<i>Work Procedures – Materials Handling</i>		
Is material handling space adequate?		
Is material handling equipment adequate and proper?		
Is material handling equipment in good condition?		
<i>Other (e.g., tunnels, excavations, shafts)</i>		

Comments:

APPENDIX C. OSHA INSPECTIONS AND LOGS

1. OSHA Inspections
2. OSHA 300 Logs

**APPENDIX D SUBCONTRACTOR'S SITE-SPECIFIC SAFETY PLAN
TEMPLATE**

END OF SECTION

SECTION 01569

SYSTEM SAFETY CERTIFICATION

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section specifies requirements to produce a Safety Certification Report which shall certify that at the time of inspection, all Safety Critical Elements of this Contract are safe for passengers, MBTA employees, emergency responders, and the general public. The formal document also ensures that all Safety Critical Elements are in compliance with regulatory codes and agencies.
- B. Final acceptance of the Safety Certification Report shall require written approval of the MBTA Chief of Safety.
- C. The **System Safety Certification Program Policy**, which applies to operating systems (e.g., fire alarms, operation control centers, vent/fans, signal/power systems, vehicles, and operation plans) and construction projects (i.e., stations, facilities, rails, and bridges). Collection of all certification reports, verification of the safety and acceptance by the MBTA of all Safety Critical Elements, and the Safety Certification Report shall be the responsibility of the Contractor.

1.2 SAFETY CRITICAL ELEMENTS

- A. The safety certification work covers operational safety under system safety, operational safety, and occupational safety. The project elements which are safety critical and a list of specification with inspection, report, and training requirements will be developed by the System Safety Engineer, the Construction Project Manager, and the design consultant.

1.3 PROGRAM TASKS

- A. The MBTA System Safety Engineer shall identify all Safety Critical Elements. The Contractor shall compile and document the safety requirements as described under Part IV, A, Task 1 of the attached System Safety Certification Policy.
- B. The Contractor shall verify equipment and system elements; verify procedural system elements; verify personnel training; verify system integration; and perform safety certification for the Safety Critical Elements of this Contract as described under Part IV B through F of the attached System Safety Certification Policy.

1.4 MEASUREMENT AND PAYMENT

- A. No separate measurement and payment will be made for work required under this Section. All costs in connection therein shall be considered therewith shall be considered incidental to the item or items of work to which they pertain.

MBTA
SYSTEM SAFETY CERTIFICATION PROGRAM

I. INTRODUCTION

The goal of this Safety Certification Program is to certify that all practical steps have been taken to optimize the operational safety of the MBTA during and after construction, **before** the start of revenue service.

The program will be conducted by the MBTA as a self-certifying agency. The Safety Certification Program is administered by the MBTA Safety Department which reports directly to the General Manager's Office.

The program requires the support of all affected departments. The Safety Department is responsible for coordinating the documentation of all tasks that address safety critical elements. Safety Critical elements are defined as those items assessed as needed to eliminate, minimize, or control hazards, which could result in death, severe injury, or major system or public property damage. Safety certifiable elements exist in system equipment, facilities, procedures, and personnel, both individually, and as an integrated whole. (See Pages 4 & 5 for examples of certifiable elements).

Specific activities of the Certification Process include:

- (a) Identification of safety requirements
- (b) Verification of compliance with safety requirements
- (c) Identification and resolution of non-compliances (open items).

II. PROGRAM OBJECTIVES:

The objective of the Safety Certification Program is to produce a formal document that ensures at the time of operation, a particular system is safe for passengers, employees, emergency responders, and the general public. Safety Certification verifies that the project is in compliance with regulatory codes and agencies. For example, when a train station is modernized, the Safety Certification Program will ensure that the Fire Alarm System meets the applicable state and city codes, and the MBTA will receive an occupancy permit stating the station is acceptable to the fire department. The Safety Certification Program will identify which items require certification and will verify that the contract documents incorporate safety requirements from the design stage. This program will also verify procedures/results and identify open items or work arounds.

The ultimate objective for this program is to provide overall risk reduction by systematically addressing hazards before opening for revenue service. This Safety Certification Program has already proved its importance with the opening of the Blue Line on June 24, 1995, and the New Old Colony Railroad, on September 26, 1997. The Safety Department was able to identify safety critical elements to ensure that they were addressed prior to the start of revenue service.

With this proactive program in place, we can expect positive results: a safer railroad.

III. PROGRAM SCOPE:

The Safety Certification Program covers Operational Safety only, under three different, but overlapping functional areas:

- (a) System Safety - the application of operating, technical, and management techniques and principals to the safety aspects of a system throughout its life to reduce hazards to the lowest practical level through the most effective use of available recourses.
- (b) Fire/Life Safety - elimination, minimization, or control of potential hazards to patrons, employees, emergency response personnel, and the general public caused by fire, smoke, explosion, or resulting in panic; and the protection of MBTA property from fire or explosion.
- (c) Occupational Safety - elimination, minimization, or control of potential hazards to employees and emergency response personnel. (The certification process itself is concerned with the end product, the operational system elements (equipment and facilities, personnel, procedures), and the integration of these elements into one integrated and independent operation).

The following are typical Certifiable Elements:

(a) Systemwide Elements

- 1. Safe Braking
- 2. Automatic Train Control
- 3. Communications Equipment
- 4. Passenger Vehicles/Locomotives
- 5. Train Clearance
- 6. Running Rail/Field Welds
- 7. Signals
- 8. Grade Crossings
- 9. Bridges/Structures

(b) Facility

- 1. Passenger Stations
- 2. Layover Facilities
- 3. Site Security
- 4. Central Control
- 5. Maintenance Facilities

(c) Procedural Elements

- 1. Operations Rules and Procedures
- 2. Maintenance Rules and Procedures
- 3. Emergency Response Rules and Procedures
- 4. Personnel Training and Qualification Procedures

(d) Personnel Elements

- 1. Operations Personnel
- 2. Maintenance Personnel
- 3. Emergency Response Personnel

(e) **Integration Elements**

1. Integrated Test Procedures
2. Integrated Test Reports
3. Pre-Revenue Operations Test Procedures, including Emergency Response Scenarios
4. Pre-Revenue Operations Test Reports (e.g., grade crossing tests)

IV. PROGRAM TASKS

The program tasks described in this section comprise the overall certification process. Procedures, methodologies, checklists, work flow charts, schedules and other documentation necessary for the conduct, review and completion of tasks will be prepared under the appropriate task.

A. TASK 1 - IDENTIFICATION AND DOCUMENTATION OF SAFETY REQUIREMENTS

This task will involve the identification, compilation and documentation of safety requirements applicable to the equipment/facility and system elements shown under Section III of this plan.

Source documentation for the identification of safety requirements will include:

1. The technical specification for MBTA contract(s).
2. MBTA design and performance criteria.
3. Safety studies and analyses conducted by MBTA or consultants.
4. Pertinent Safety criteria and studies from other rail transit systems.
5. Applicable codes, standards, and regulations.

All safety requirements extracted from the technical specifications for equipment/facility element contracts and procurements will be documented on Safety Certification documents. Safety requirements extracted from source documentation, other than contract or procurement technical specifications, will be identified for resolution as open-items.

Primary emphasis will be given to identifying those safety elements that are "safety critical". Safety critical elements, as defined earlier, are those items assessed as needed to eliminate, minimize, or control hazards, which under consideration of the potentially worst critical mishap could result in death, severe injury, or major system or public property damage. However, safety codes and standards not falling within the above "safety critical" category will be included in the program so that non-critical safety elements can be verified. Safety Critical elements will be shown in "**Bold Type**" when producing a list of certifiable elements.

B. TASK 2 - VERIFICATION OF EQUIPMENT/FACILITY AND SYSTEM ELEMENTS

This task will be applicable to construction, installation, and procurement contracts appropriate to the equipment/facility element being considered. It will involve the completion of the Safety Certification elements listed in Task 1, to verify that contractors have complied with safety requirements. If non-compliance with a safety requirement is identified, it will be logged as an "open item" and tracked for resolution as described under Task 6.

C. TASK 3 - VERIFICATION OF PROCEDURAL SYSTEM ELEMENTS

Safety review and verification of MBTA operational rules and procedures and personnel training documentation will be conducted to ensure that procedural documents display contributions to certifiable levels of safety for the operational system. This task will be verified by the Safety Department.

A Safety Certification Procedures Review Log will be prepared and used to document the results. Where non-compliance with established safety requirements are found, or where new requirements are identified during reviews, they will be logged as an "open item" and tracked for resolution. (See Sample - Table 1).

D. TASK 4 - VERIFICATION OF PERSONNEL TRAINING AND QUALIFICATIONS

Verification of personnel training and qualification for operations, maintenance, and emergency response personnel will be conducted by review of personnel certification documentation provided and approved by the Operations Manager and the Chief Engineer. Verification under this task will be conditional, pending final verification under Task 5 - System Integration.

E. TASK 5 - VERIFICATION OF SYSTEM INTEGRATION

1. This task will consist of safety review and verification of:
 - (1) Integrated Test Procedures
 - (2) Integrated Test Reports
 - (3) Pre-Revenue Operations Test Procedures, including Emergency Response Scenarios
 - (4) Pre-Revenue Test Reports
2. Integrated Tests are conducted to verify the physical and/or the functional operations of equipment/facility elements that are integrated with other equipment/facility elements, subsequent to or as part of Acceptance Tests for individual equipment/facility elements. For example, when testing an elevator in a station, you must also test the emergency call system inside the elevator and at the platform at lobby levels. Integrated Test Procedures identified as required to verify the safety of operations, or the integrity of emergency response communications will be reviewed to:
 - (1) Verify the incorporation of safety requirements, and
 - (2) Verify that the procedural content, including test pre-requisites, is sufficiently consistent with the stated purpose(s) or objective(s) of the test.

Safety requirements will be extracted from pertinent source documentation listed in Task 1. Integrated Test Reports and any separate quality surveillance reports will be reviewed to verify that the safety requirements and parameters established by the approved test procedure have been met, and that any test non-compliances have been resolved.

3. Pre-Revenue Operations Tests are conducted subsequent to the completion of integrated tests, to verify the operational readiness of conditionally qualified operational personnel, emergency response personnel, and/or procedures, through simulated revenue service. Normal and abnormal operations are conducted, including emergency

response scenarios. Pre-revenue operation test procedures will be reviewed to verify that the stated purpose(s) of the simulated revenue service, and the overall procedural content, are of sufficient scope and depth to display the overall operational safety status. Along with others, Safety personnel will monitor and report on the conduct of pre-revenue operations tests to:

- a. Assess the effectiveness and the need for additions to, or revisions of, operational rules and procedures, or retraining of personnel.
- b. Assess the effectiveness of emergency response scenarios and response activities.

Pre-revenue operations test reports, safety assessment reports and any other reports will be reviewed to verify that a certifiable level of operational safety has been demonstrated during the conduct of pre-revenue operations. Where such reports display deficiencies in operational rules or procedures, or in compliance with rules and procedures, or in the effectiveness of the conduct of emergency response procedures, each deficiency will be logged as an "open item" and tracked for resolution as described under Section IV, Task 6.

4. Pre-revenue operations tests must be completed at least 2 weeks prior to opening revenue service.

F. TASK 6 - SAFETY CERTIFICATION

This task will be conducted to verify and display, by documentation, that a certifiable level of operational safety has been achieved for the MBTA System, and will include:

1. Preparation of a chronological summary report to display and discuss the safety certification activities that have been conducted.
2. Preparation of a comprehensive list of certification documentation.
3. Preparation of an Open Item Status Report, to display the status of all open items identified during the conduct of the certification program. This report will be based on open items documented on Form SC-2. Form SC-2 will be generated by the System Safety Engineer or designee as needed.

Open items will be resolved by:

1. Corrective Action
 - (1) Contract Change Order or Contract Procurement.
 - (2) Resolution
 - (3) Temporary Resolution - deferral or corrective action with or without a work around.
 - (4) Final Resolution.

All open items will be entered on a Safety Certification Open Item Status Log which will be used to track, report on and document the resolution of each item until closed out (see sample Table 1).

4. A Safety Certification Report will be submitted to the General Manager. This report will be prepared by the Safety Department showing all initial finding(s), conclusion(s), and recommendation(s).

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 01570
TRAFFIC REGULATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the general requirements for traffic regulation.
- B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 01020 – ALLOWANCES.

1.2 BARRICADES, WARNING SIGNS AND OTHER PROTECTIVE DEVICES

- A. Barricades, barrier fences, traffic signs, drums with flashers, or other traffic devices will be provided at locations within and around the construction area which present a hazard to motorists or pedestrians. The type, amount, locations, and duration of such devices will be as directed by the Engineer. No additional compensation will be made for protective devices. This work will be considered incidental to the item of work to which it pertains.
- B. The Contractor must supply signage controls to keep the existing facility operational.

1.3 TRAFFIC OFFICER SERVICES

- A. Provide such police officers as the Engineer deems necessary for the direction and control of pedestrian and vehicular traffic within the site or sites. Police officers shall wear regulation uniforms.
- B. All requests for police details shall be referred to the MBTA Transit Police Detail Officer (Tel. 617-222-1270). The MBTA Transit Police Detail Officer will arrange for the appropriate and sufficient number of details. The request shall be forwarded to the MBTA Transit Police Detail Office, with a copy to the Engineer, well in advance to enable him to make the required arrangements. It is the policy of the Authority to use the services of the MBTA Transit Police for details when they are required.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Except as specified in Part 1 "Traffic Officer Services" Article, no separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.
- B. Measurement: Work specified in this Section for Traffic Officer Services will not be measured but will be paid for under an allowance for Item 0130.429. The allowance will be adjusted to the actual amount paid for all such work. The Contractor shall furnish itemized statements of the work performed and give the Engineer access to accounts, bills, and vouchers relating thereto, and unless the Contractor does furnish such itemized statements, bills, and vouchers, he shall not be entitled to payment for the related work. The allowance will be made to reimburse the Contractor for all services required for the work specified herein.

4.2 PAYMENT

- A. Payment: Payment for the work of this Section will be used on itemized statements furnished by the Contractor to the Authority without any mark-up for overhead or profit. No other costs will be paid for work of this Section.

4.3 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0130.429	TRAFFIC OFFICER SERVICES	AN

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This Section specifies Project Identification and Signs.

1.2 PROJECT SIGN

- A. Unless specified otherwise in the Contract Specifications, provide two general construction signs and one Engineer's field office sign as specified herein. Construction signs shall be approximately 4 feet by 8 feet in size, mounted on two posts set in the ground where directed. The Engineer's field office sign shall be approximately 3 feet by 6 feet in size for wall or post mounting as directed by the Engineer. Signs shall be constructed of 3-inch painted waterproof plywood for which the wording and colors will be determined by the Authority.
- B. Where and as approved by the Authority, the contractor shall erect and maintain signs identifying the Project and indicating State and Federal participation.
1. One (1) sign of each type shall be erected at the project site where and as directed by the Engineer for maximum public identification of the work and shall be maintained in good condition until completion of the project. Upon completion, the signs shall be removed.
 2. Signs are to be cut from standard 4' by 8' waterproof plywood sheets, or other suitable material, and shall meet the design standards as shown in the attached figures (Sign Type A – State, Sign Type B – FTA).
 3. The size may be varied to meet special or local requirements, but proportions shall be maintained.
 4. Information and color of 6" horizontal color band to be included in Sign Type A shall be supplied to the Contractor by the Engineer.
 5. No information shall be included on the project signs, except that stipulated in the above paragraphs.
- C. Maintain signs in good condition until completion of the Project. Remove the signs upon completion when directed by the Engineer.
- D. Display Panel
1. Construction, dimensions, colors and lettering shall be as per MBTA Standards.
 2. Verbiage: The Authority shall furnish the text, photograph and other graphics, and the Contractor shall furnish design and layout, and printing which are all subject to the approval of the Engineer prior to installation in the display panel.

Installation of final, approved product in the display panels shall be made by the Contractor.

3. Quantity: One single sided, dual compartment display panel shall be installed on the job site as directed by the Engineer.

PART 2 – PRODUCTS

NOT USED

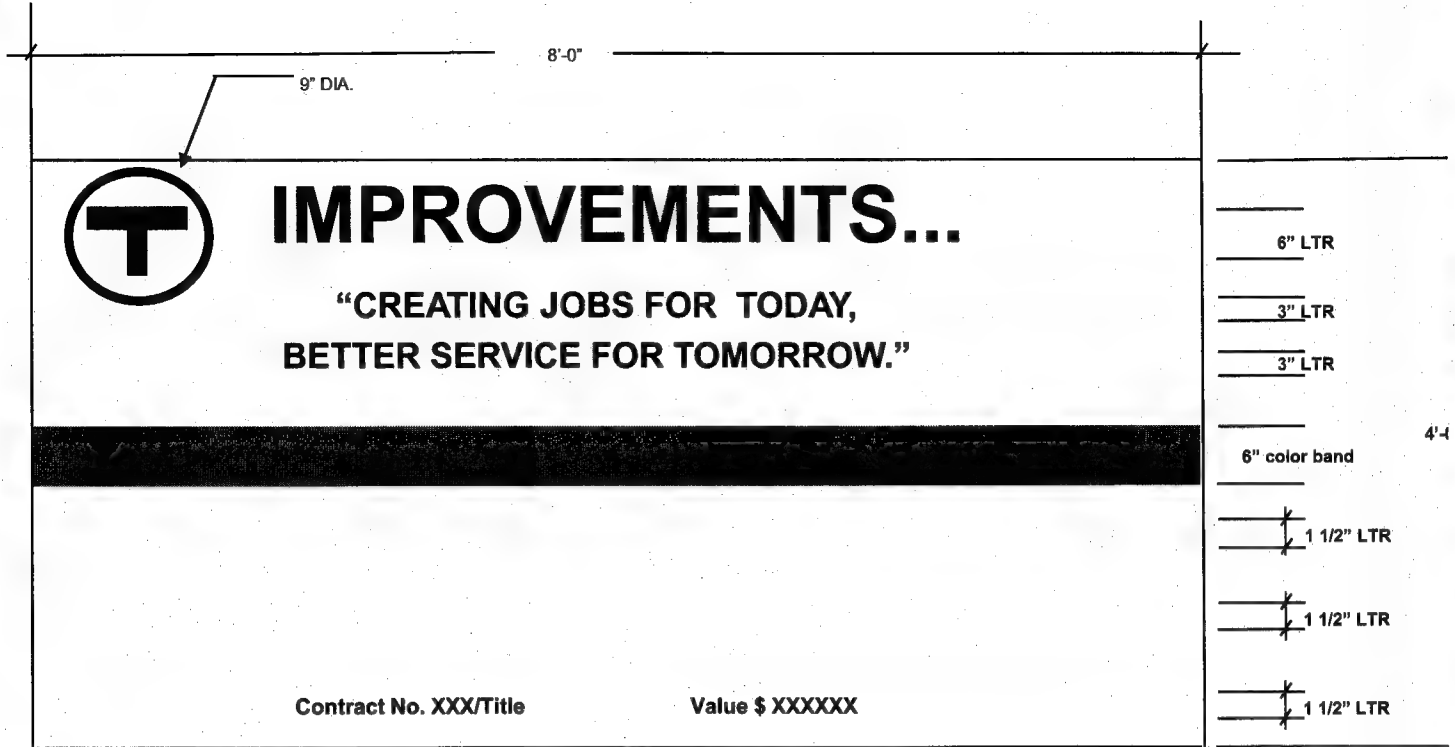
PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

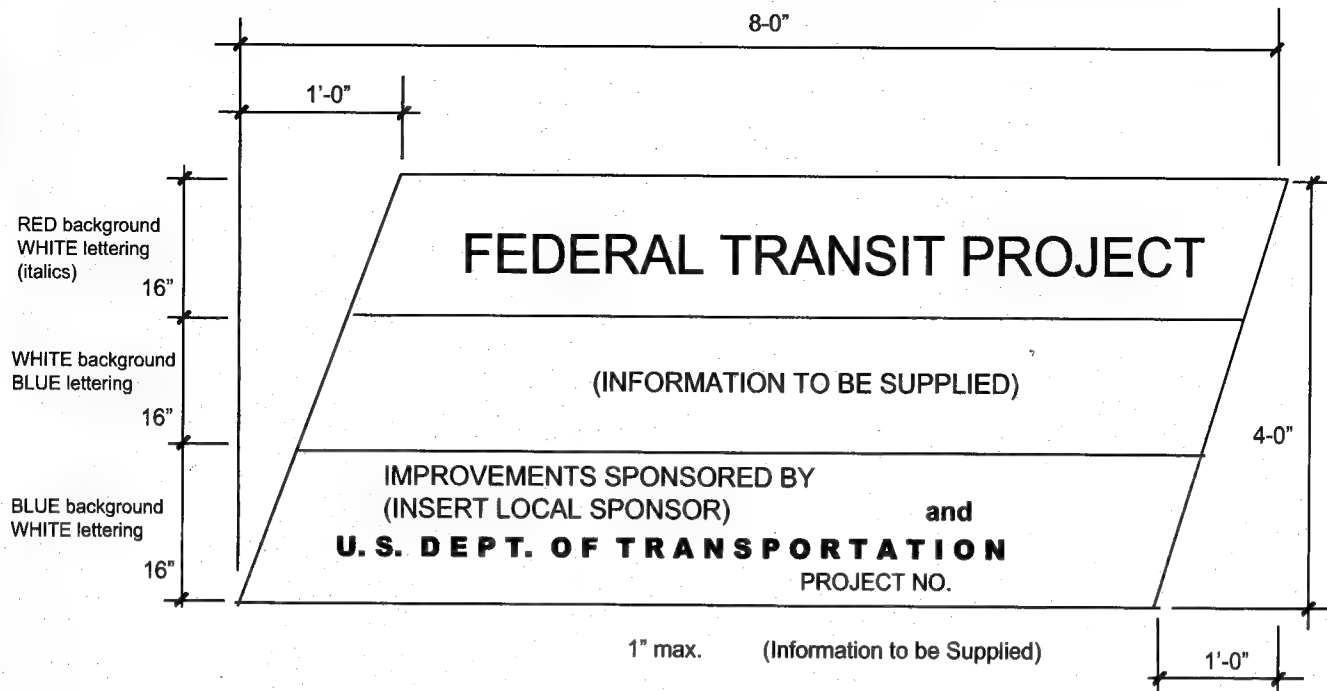
4.1 GENERAL

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.



- COLOR BAND TO DENOTE LINE
- TEXT TO BE HELVETICA MEDIUM
- CONTRACT NO. & VALUE TO REFLECT APPLICABLE CONTRACT

SIGN TYPE A



Lettering: Futura Bold Italic (top)
Futura Bold (center)
Futura Demi Bold (bottom)

Adopted July 1966

SIGN TYPE B

END OF SECTION

R20CN01
2015

PROJECT IDENTIFICATION AND SIGNS
01580-4

CONFORMED SET
Work Platforms for Riverside Carhouse

SECTION 01590

FIELD OFFICES AND SHEDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A.** This Section specifies the general requirements for field offices and sheds.
- B.** The work under this section includes all labor, equipment, materials, and services to furnish, install and maintain a field office for the MBTA's Engineer in a location approved by the Engineer in the immediate location of the project, separate from any building or buildings used by the Contractor.
- C.** The work includes but is not necessarily limited to:
 - 1. One (1) new modular trailer field office.
 - 2. Sanitary facilities.
 - 3. Heating facilities.
 - 4. Lighting facilities.
 - 5. Telephone and electric services.
 - 6. Fencing and gates for field office area.
 - 7. Office furniture and equipment.
 - 8. Maintenance of field offices.
 - 9. Inspection devices.
- D.** The area occupied by the trailer and associated parking spaces shall be enclosed with a 72 inch high chain link fence including a twelve-foot clear opening double-swing gate and a four-foot pedestrian gate all with three-strand barbed wire on extension arms conforming to Section 02444 Chain-Link Fence and Gates of the Standard Specifications and approved by the Engineer. Payment for the enclosure fence shall be made under item numbers in Section 02444.
- E.** Submittals
 - 1. Trailer layout, details and equipment list.
 - 2. Product Data: For each type of equipment.
 - 3. Insurance certificates.

PART 2 - PRODUCTS

2.1 FIELD OFFICE

- A. Provide one (1) new modular field office trailer, fully equipped and ready for occupancy by the Authority, prior to the commencement of any construction work on the project. The trailer shall remain on location for 90 days after final acceptance of the contract.
- B. Modular field office trailer shall be manufactured by McCarthy Mobile Offices Inc., Lynnfield, MA; Relco Corporation, North Andover, MA; Design Space International, Medford, MA; or equal. Trailer shall contain approximately 480 square feet of floor space, and shall include the following provisions unless otherwise noted:
 - 1. Partitions for office, toilet area, conference room, etc., as follows:
 - a. A trailer with one office (140 sq. ft.), one conference room (300 sq. ft.), and toilet facilities and kitchenette facilities.
 - 2. Overhead cabinets and bookshelves.
 - 3. One wardrobe closet.
 - 4. All windows operative.
 - 5. Shades or venetian blinds for windows.
 - 6. Air conditioning and electric heating equipment capable of maintaining a temperature of 70°F.
 - 7. Two-tube florescent lighting fixtures as required to provide illumination of 70-foot candles in all areas, controlled by surface mounted toggle switches located near the entrance for each room of the trailer as directed by the Engineer.
 - 8. Double convenience receptacles located throughout the trailer.
 - 9. Electric sanitary water cooler with refrigerated storage compartment, supplied with cups and bottled spring drinking water for the duration of the project.
 - 10. Sanitary facilities, including supplying toilet tissue, paper towels and soap supplied weekly.
 - 11. Refrigerator – 3.3 cubic foot capacity.
- C. Arrange for and comply with all necessary local permits and inspections including and incidental costs.
- D. Arrange for electrical service for the trailer and provide the necessary meter connections, fuse box and switch as required by the utility company.
- E. The trailer shall be “blocked-up”, “leveled off” and the bottom closed in with plywood or other approved material as directed by the Engineer. Provide approved accessible approach and entrance in compliance with 521 CMR.

- F. All electrical and plumbing work shall conform with state and local codes.
- G. Provide 3/4-inch copper tubing for the water service, provided with sufficient pressure to completely expel the contents of the water closet in one operation. Provide approved electrical heating tape, as directed, together with necessary switches and thermostat for each water pipe, to prevent freezing.
- H. Provide suitable septic tank and make proper sanitary connections thereto from the trailer if sewerage facilities are not available.
- I. Insulate all services where necessary.

2.2 FIELD LABORATORY

- A. Where required by the Contract Specifications, provide a field laboratory to be used exclusively by the Engineer and his inspectors to conduct materials and soil tests. The field laboratory shall have a minimum floor space of 160 square feet, be entirely enclosed, and provided with two windows with screens that can be opened and one door capable of being locked. Equip with suitable work tables, benches, and chairs, and cupboards and lockers with locks and keys for storage of equipment and records. The building shall be maintained weatherproof, and have satisfactory lighting, heating, and water supply and sanitary facilities. The laboratory shall be situated as approved by the Engineer at a location on the Contract site or in the immediate vicinity thereof, or may be in a trailer which shall be moved to various locations as required by the Engineer.

2.3 FIELD OFFICE EQUIPMENT

ADDENDUM 4, ITEM NO. 3

Two of the three tablet computers required by paragraph 01590-2.3.A.25.b shall become the property of the MBTA upon completion of the work. All other equipment for Engineer's field office shall remain property of the Contractor upon completion of the work, in accordance with paragraph 01590-2.3.A.

- A. Equipment for Engineer's field office shall remain property of the Contractor upon completion of the work. Equipment to be provided shall include the following:
 - 1. Suitable non-freezing type fire extinguisher shall be furnished for each trailer.
 - 2. Two office type desks, minimum top dimensions 32 in. x 60 in., with two or more drawers on each side.
 - 3. Three swirl desk chairs on casters with adjustable height tilt seat (one for each office type desk).
 - 4. One slant-top drafting table, 48 in. x 89 in. minimum size with cover and storage compartment, and a parallel rule.
 - 5. One adjustable height swirl type stool (drafting table type) on casters.
 - 6. The drafting table shall be provided with a swivel type drafting table lamp as approved by the Engineer.

7. Two utility tables 30 inches high, minimum top size 30 in. x 60 in. (one for each office type desk, two for conference table).
8. Fifteen folding-type chairs (one for each desk plus thirteen for conference trailer).
9. One fire-resistant drawer-type safe, legal size, with combination lock. Combination to be reset at the direction of the engineer and revealed only to him.
10. Two lateral size metal filing cabinets, four drawers, with lock to remain the property of the Authority.
11. One electric pencil sharpener.
12. Two fully automatic electric calculators with tape standard 10 bank. Provide tape for the duration of the project.
13. Printer/Copier – One plain paper four-in-one function device (print/copy/scan/fax) capable of accepting originals sized up to 11 x 17 inch and of making reductions or enlargements. Provide network connections to office computers. Provide maintenance, paper, toner, and all other required copier supplies for the duration of the project.
14. Two lockers with locks shall be supplied for Field Inspectors.
15. Three round wastebaskets.
16. Provide telephone service consisting of separate line to trailer, line having a unique telephone number. Telephone service shall include two (2), one-line phone and one dedicated line for the telecopier (FAX) machine. Phone line shall be designated for voice service and shall have call waiting and call forwarding.
17. Provide two cell phones for the duration of the project.
18. Provide two battery operated wall clocks.
19. Two dust pans and brushes.
20. Two 50 LF fiberglass tape (Engineer's).
21. Two 100 LF fiberglass tape (Engineer's).
22. One two-foot smart level, to remain the property of the Authority at the completion of the project.
23. One plan rack to be equipped with 10 rods of an approved design.
24. Furnish and maintain two industrial type first aid kit.
25. Computers:
 - a. Two desk-top computers: Lenovo Think Centre, Hewlett Packard Pavillion, Dell Precision, or Engineer approved equal.

- b. Three tablet computers: Microsoft Surface or Engineer approved equal. Provide each tablet computer with ruggedized cover, keyboard and its attachment, stylus, screen cover, protective case, connectivity adaptor(s) to connect to projector, camera, external storage device, headphone/microphone and charging connector. Each tablet shall have a minimum 64 GB storage, wi-fi and 3G or 4G connectivity.
 - c. Pre-loaded software to include at a minimum for each desk-top and tablet computer: Email, Microsoft Office Suite-Professional Edition, Utilities software, and Adobe Acrobat Standard Edition.
 - d. Consult MBTA IT Department for complete specifications prior to submitting bid.
 - e. Warranty and 3G/4G Service – Provisions for on-site service, Monday-Friday 8am - 5pm EST. Service contract must cover the period from the issuance of Contract Notice to Proceed through Contract Closeout.
26. Provide all equipment (hardware, software, licenses, data communications lines, equipment, and installation services) necessary to enable all tablet computers to fully participate in the MBTA's network. Participation to include the capability to log in to all Authority networked applications including, but not limited to the MBTA network, the Authority's Capital Management System, MBTA Email, and the Authority's document storage and retrieval system.
- a. Connectivity to MBTA network using the current standard models of Cisco switch and Cisco router. (contact MBTA manager of Data Communications for current standards)
 - b. Provide minimum 384K bandwidth for 1-3 users and minimum 768K bandwidth for 3-12 user project offices.
 - c. Provide 8 AM – 5PM EST on-site maintenance for all related equipment for the duration of the project.
27. Provide one Concrete Air Meter, Type B complying with the requirements of ASTM C231. Acceptable suppliers include:
- a. Forney, Inc.
c/o Myers Associates
28 Horseshoe Drive
Scarborough, ME 04074
Model No. LA-0316
 - b. TMI
1048 24th Street
Beaver Falls PA 15010
Model No. CA-500
 - c. Humboldt, Inc.
7300 West Agatite Avenue
Norridge, IL 60656
Model H-2786P
 - d. Engineer approved equal

2.4 MAINTENANCE OF FIELD OFFICE

- A.** The Contractor shall provide maintenance and custodian service which shall include the following:
 - 1. Daily trash removal
 - 2. Weekly floor cleaning and waxing
 - 3. Clean windows twice a month
 - 4. Necessary repairs to damaged, vandalized or defective parts of equipment
 - 5. Continue maintenance for 90 days after final acceptance of the work and keep the field offices clean, orderly, and in working condition at all times
 - 6. Protect the field offices and their contents throughout the 24 hours of the day and be responsible for any loss of property of employees of the Authority housed therein, due to either fire, theft, vandalism or other causes.
 - 7. Title to the field offices and equipment shall remain in the name of the Contractor, except as specified herein
 - 8. Payment of regular electrical utility charges, and regular telephone charges will be the responsibility of the contractor.

2.5 INSURANCE AND REPLACEMENT

- A.** At the time the field offices are made available to the Authority, the Contractor shall furnish evidence to the Engineer that insurance has been obtained which will protect the Authority and/or its employees against loss of property in the office trailer from fire, theft, storm, or flood.
- B.** The insurance shall be satisfactory to the Authority in form, coverage and substance in the amount of \$2,500 non-deductible. The insurance shall be kept in effect 60 days after final acceptance of the work, with evidence of all necessary renewals being promptly forwarded to the Engineer.
- C.** In case of fire, theft, vandalism, or breakdown, all equipment involved shall be repaired or replaced by the Contractor within 48 hours and in the event a field office is destroyed or rendered untenable for any reasons, it shall be replaced within two weeks or as directed.

2.6 DEMOBILIZATION OF ENGINEER'S FIELD OFFICE

- A.** The Contractor shall not sooner than sixty (90) days or longer than ninety (120) days from the final acceptance date of the work, remove and take possession of the trailer field offices, and all other associated Engineer field office improvements to include water cooler, wooden steps, drafting table stool, drafting table, safe, pagers, copier and facsimile machine, as well as fire extinguishers, desk chairs, folding chairs, filing cabinets, lockers, wastebaskets, and telephones. The Contractor shall perform the necessary work to leave the Engineer's field office site in a neat and orderly condition. All other utilities shall be cut at the property line and plugged.

2.7 MEASUREMENT

- A. All work included in this Section will be paid for at a Lump Sum price, which price and payment therefore shall constitute full compensation for all work as specified.

2.8 PAYMENT

- A. Installation of potable water supply, sanitary waste disposal, telephone and electrical service to the field offices, including all associated materials and labor incidental to providing the services, shall be included under the contract lump sum price for the Field Office.
- B. Payment for the Field Office and all other work specified in this section will be made at the contract lump sum price for Field Office-Trailer, Payment Item No. 0130.100, which price shall include full compensation for all material and work required. The basis of payment will be 50% of the lump sum price stipulated under Payment Item No. 0130.100, payable on the first estimate subsequent to complete installation of the field office with all equipment required. The remaining 50% will be pro-rated in equal amounts on each subsequent monthly estimate. The final month pro-rate amount will not be paid until the final payment. No separate payment will be made for utilities, holding tank, services, suppliers, maintenance, insurance, incidentals, and all costs therewith shall be included in the lump sum price.

PART 3 - EXECUTION

Not used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the General requirements for materials and equipment, including the delivery, handling, transportation, and storage thereof.

1.2 QUALITY OF MATERIALS

- A. Materials provided shall be new, except as may be indicated otherwise in the Contract Documents. The materials shall be so manufactured, handled, and to provide completed work in accordance with the Contract.

1.3 DELIVERY, HANDLING AND TRANSPORTATION

A. Delivery:

- 1. Deliver materials and equipment to the site so that there will be neither delay in the progress of the Work nor an accumulation of material that is not scheduled to be used within a reasonable time.

B. Handling:

- 1. Avoid bending, scraping, or overstressing materials and equipment. Protect projecting parts by blocking with wood, by providing bracing, or by other approved methods.
- 2. Materials and equipment shall be protected from soiling and moisture by wrapping or by other approved means.
- 3. Small parts shall be packaged in containers such as boxes, crates or barrels to avoid dispersal and loss. Firmly secure an itemized list and description of contents to each such container.

- C. Transportation, Loading, transporting, unloading and storage of all materials and equipment shall be conducted such that they are kept clean and free from damage.

1.4 STORAGE AND PROTECTION

A. Storage:

- 1. Provide sheltered, weathertight or heated weathertight storage as required for materials and equipment subject to weather damage.
- 2. Provide blacking, platforms or skids for materials and equipment subject to damage by contact with ground

- B. Store packaged materials in their original unbroken package or container.
- C. Protection. Protect materials and equipment from damage during warehousing operations
- D. The Contractor shall obtain approval of the Engineer for all material storage sites on the Authority's property and shall be solely responsible for the security of such storage sites at no additional expense to the Authority.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of work to which they pertain.

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the general requirements for protection and final clearing of floor coverings, the providing of operations and maintenance manuals, and the providing of As-Built Drawings.
- B. Related Work:
 - 1. Article 6.2 – PROSECUTION OF WORK and Article 6.4 – LIMITATIONS OF OPERATIONS in Section 00700 – GENERAL CONDITIONS, for definitions of phased acceptance of the Work.

1.2 PROTECTION AND FINAL CLEANING OF FLOOR COVERINGS

- A. Protect finished floors and floor coverings after completion of Work. Final cleaning of all floors and floor coverings shall be the responsibility of the Contractor.
- B. Immediately after acceptance by the Authority, clean floors and floor coverings and base. Clean floor finish material or covering as recommended by the manufacturer, and in accordance with the manufacturer's directions.

1.3 FINAL CLEANUP

- A. See Section 01560 - TEMPORARY CONTROLS.

1.4 PERMITS

- A. The Contractor shall obtain, and submit to the Authority, all required Certificates of Inspection and Occupancy prior to acceptance and final payment for the Work.

1.5 OPERATIONS AND MAINTENANCE MANUALS

- A. At least one month prior to turning over the Project to the Authority for occupancy, deliver to the Engineer three complete indexed files containing approved data as follows:
 - 1. Operating manuals and operating instructions for the various systems.
 - 2. Catalog data sheets for each item of mechanical equipment actually installed, including performance curves, rating data and parts lists.
 - 3. Catalog sheets, maintenance manuals, and approved shop drawings of all mechanical equipment controls and fixtures with all details clearly indicated, including size of lamps.

4. Names, addresses and telephone numbers of repair and service companies for each of the major systems installed.

1.6 AS-BUILT DRAWINGS

- A. The Authority will provide one set of black or blue line on white drawings to the Contractor to maintain and submit as As-Built Drawings. Maintain these prints at the site and at all times, absolutely, clearly, and completely show the actual installations in accordance with the Contract requirements. Record all subcontractors' changes.
- B. Upon completion of the Work and after checking the subcontractors' As-Built Drawings, and all required drawings, submit a complete set of marked-up record drawings to the Engineer by registered mail in time to be used for the final inspection, and acceptance and for verification by the designer. Availability of as-built drawings shall be a prerequisite to scheduling a final inspection of the Contract and these drawings and the Contract Documents will be used in checking completion of the Work. Nonavailability of As-Built Drawings or inaccuracies therein may be grounds for cancellation and postponement of any scheduled final inspection by the Authority until such time as the drawings are available or the discrepancy has been corrected. Upon completion of the work, the as-built drawings shall become the property of the Authority. If As-Built Drawings are not maintained as required herein to the satisfaction of the Engineer, the Authority will deduct from monthly partial payments, an amount representing the estimated monthly cost of maintaining the as-built drawings, and will continue deduction of the 5 percent retainage after 50 percent completion of the Contract, as provided in Section 01151 - MEASUREMENT AND PAYMENT.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item or items of work to which they pertain.

END OF SECTION

SECTION 02080

ASBESTOS ABATEMENT AND RELATED WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Examine all conditions as they exist at Riverside Carhouse located in Newton, Massachusetts, prior to submitting a bid for the work of this specification. The work of this specification includes the proper removal and disposal of various asbestos-containing materials (ACMs), asbestos-contaminated materials and selective demolition of various fixtures, components and non-load bearing structures as outlined in this specification. Related work is described in Section 1.03 of this specification.
- B. All provisions of this specification relating to the health and safety of workers and the general public, as well as protection of the environment are minimum standards. The Contractor is responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices in the industry, and implementing such measures if deemed necessary, or appropriate. Nothing in this specification shall be deemed to relieve the Contractor from any liability with respect to any such legal requirements or requirement of prudent conservative industry practice.
- C. All work under this specification, except as noted herein, shall be performed by a contractor holding a current Massachusetts Department of Labor Standards (DLS) Asbestos Contractor's license. As used in this specification, the term Contractor refers to the General Contractor's hazardous materials Subcontractor who is licensed as an Asbestos Contractor.
- D. The awarded Contractor shall perform all work under this section, as well as other related sections that are referenced herein. The overall goal of the project is to properly remove and dispose of asbestos-containing materials from this site. All surfaces shall be thoroughly cleaned and decontaminated as part of this project in order to provide the Owner with bare/unfinished surfaces. Coordination and sequencing of items to be performed on this project shall be the responsibility of the Contractor.
- E. For the purpose of this specification, the following definitions apply:
 - "Site" shall refer to the building identified as Riverside Carhouse located at 325 Grove Street in Newton, MA.
 - "Owner" shall refer to MBTA.
 - "Consultant" shall refer to Cardno ATC, who will act as the designated authorized representative of the Owner for the purpose of performing visual inspections, monitoring of the regulated work areas and conducting clearance air sampling.
 - "Contractor" shall refer to the General Contractor's hazardous materials Subcontractor holding a current Massachusetts DLS license as an Asbestos Contractor.

1.2 SCOPE OF WORK

- A. The work covered by this specification includes the proper removal and disposal of asbestos-containing materials (ACM) and asbestos-contaminated materials associated with the limited

renovation of the building. This specification describes procedures and equipment required to protect workers, and the general public from contact with airborne asbestos fibers during work area preparations, removal and renovation activities, and provides information on containment, storage, transportation and disposal of the generated ACM wastes.

- B. The scope of work under this specification also references other related work as noted in Section 1.3. Review and coordination with the requirements of these sections is mandatory for performing work under this specification and the overall project.

The scope of work for the Contractor includes the following:

1. Perform selective demolition to access ACM as needed. Selective demolition does not include load-bearing elements and structures.
 2. Coordinate appropriate fire detail for duration of abatement project if performing "hot" work.
 3. Filing all notifications to appropriate federal, state and local authorities.
 4. Establish regulated work area containments to perform the work described herein. Include all materials, labor, supplies, etc. as required to maintain negative pressure work area enclosures.
 5. Furnish all labor, equipment, supplies, staging, lifts, dumpsters, transportation, etc. to complete the work described herein.
 6. Install temporary lighting as required for the duration of the asbestos abatement project.
 7. Provide temporary power as needed during abatement activities or tie into existing utilities.
 8. Perform pre-cleaning activities in all locations where feasible prior to establishing regulated asbestos work areas.
 9. Decontaminate and perform fine cleaning following completion of removal activities in each regulated work area containment prior to collection of final air clearance samples for asbestos. Coordinate sequencing of cleaning activities and clearance air monitoring with the work of related Sections.
 10. Perform any other work or activities required by this specification and related Sections, applicable regulations, or as necessary to perform a complete job to the satisfaction of the Owner and Consultant.
 11. Compliance with all applicable federal, state, and local regulations, as well as all requirements set forth in these Specifications and facility requirements.
- C. The Contractor shall furnish all labor, worker training, materials, equipment, and services in order to complete the work under this specification and related Sections for the complete and proper removal, decontamination, packaging, storage, transport and disposal of all identified ACM.
- D. The work to be performed under this specification at the Riverside Carhouse is summarized in the Base Bid Table listed below. The scope of work tables provide the location, estimated quantity and scope of work for the Contractor to perform. The Contractor shall examine the location and accessibility of these materials, and shall provide all necessary resources to perform the work of

this specification. In the event of any uncertainties with regard to the materials listed in the scope of work tables, the Contractor shall review the materials listed therein with the Consultant and perform the removal of these materials as defined by the Consultant at no additional cost to the Owner. Accordingly, minor variations of plus or minus 10-15% of the estimated quantities of ACM, or where locations of ACM differ than indicated, but are within the limits of the buildings, are considered as having no impact on the contract price of the Agreement.

BASE BID SCOPE OF WORK for Asbestos Abatement and Related Work

Table 1: Summary of Identified Asbestos-Containing Materials to be Removed

Material	Location(s)	Estimated Quantity	Result
MBTA Riverside Carhouse			
Roofing Material	Roof Level – at location of HVAC Unit installation	50 sq ft	Assumed to be asbestos
Asbestos Cement Panels	Basement Ceiling	1,600 sq ft	10% Chrysotile
Other ACMs identified are not included in the renovation scope of work.			

E. Refer to Appendix A – HAZARDOUS MATERIALS SURVEY: RIVERSIDE CARHOUSE – GENERAL for additional information regarding surveys of existing materials.

E. Discovery of Unidentified ACM

If the Contractor or Consultant discovers any previously untested building components suspected to contain asbestos, the Contractor shall stop all work impacting the suspect materials and notify the Consultant. The Consultant will obtain bulk samples of the suspect material and submit them for analysis to a laboratory accredited under the National Institute of Standards and Technology (NIST) "National Voluntary Laboratory Accreditation Program (NVLAP)". Any additional building components identified as ACM that have been approved by the Consultant for removal shall be removed by the Contractor and will be paid for either in accordance with the Unit Price Schedule when applicable or by an equitable adjustment to the Contract Price in accordance with the Agreement.

1.3 RELATED WORK

A. The following contain requirements related to the scope of asbestos abatement:

1. Section 02223 – SELECTIVE DEMOLITION.
2. Demolition Drawings.

1.4 COORDINATION AND PHASING OF WORK

A. Portions of the work herein require direct coordination with the Owner regarding the scope of work for selective demolition. In locations where pre-demolition can be performed prior to the start of abatement, coordinate with the Owner and Consultant to determine the schedule. The Contractor

shall coordinate all work in this specification with a representative of the Owner and Consultant. Where additional regulatory requirements apply to the work in this specification, the Contractor shall ensure compliance with all requirements.

1.5 PRE-CONSTRUCTION MEETING

- A. The Contractor shall meet with the Consultant, General Contractor and Owner for Pre-Construction meetings prior to commencing work on the project. The meeting shall be at the site or at the offices of the Owner, at a mutually convenient time and date. At the meeting, the Contractor shall be represented by authorized representatives and the field supervisor who shall run the project on a daily basis, and who shall present evidence that all requirements for initiation of the work have been met. The minimum agenda for the meetings shall be:

1. Review of "Pre-Job Submittals".
2. Channels of communication.
3. Construction schedule, including sequence of critical work.
4. Designation of responsible personnel.
5. Procedures for safety, security, quality control, housekeeping, and related matters.
6. Use of premises, facilities, and utilities.

1.6 SUBMITTALS

- A. Prior to commencing any work described herein, the Contractor shall submit the following items to the Consultant for review. No work may commence until the Consultant, the Owner and any other designated party has accepted all required submittals. Note that the submittals of this section should be coordinated with the requirements of related Sections.

1. Abatement Plan: Prepare a general Abatement Plan describing proposed engineering controls, work practices and procedures and sequencing that the Contractor will use to conduct the work of this specification and related Sections.
2. Copies of all notifications, permits, applications, asbestos contractor license, personnel licenses and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.
3. Chain of Command of responsibility at work site including supervisors, foreman, and competent person, their names, resumes and certificates of training.
4. List of employees to be used under this Agreement.
5. Copies of "Written Physicians Opinion" required by OSHA for each employee to be used on Contract. (This item may be submitted upon employee's initial arrival under the Agreement).
6. Record of successful respiratory fit test performed by a Competent Person (as defined by OSHA) within the previous 12 months for each employee to be used under this Agreement. (This item may be submitted upon employee's initial arrival under the Agreement).

7. Proposed transporter and landfill for asbestos wastes as well as the wastes generated from other related Sections.
8. Certificate of Insurance. In the amount of \$10,000,000.00 occurrence-based general liability policy to include pollution and asbestos liability. In addition, the Owner requests additional \$10,000,000.00 excess umbrella liability coverage for this project. Certificates shall name MBTA as Additional Insured.
9. A list of all equipment to be used on site, by make and model, including negative pressure equipment, HEPA vacuums, Water Atomizing Devices, etc.
10. Contractor's testing lab, American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing (PAT) proficiency, and Certification in the Commonwealth of Massachusetts.
11. A schedule detailing the proposed sequence of operations to perform the work specified herein and in the scope of work in related Sections.

B. Other Submittals:

1. Within 30 working days of receipt of asbestos waste at the approved disposal facility, the Contractor shall submit to the Owner the original copy of the "Waste Shipment Record" acknowledging disposal of all associated waste material from the Agreement showing delivery date, quantity, and appropriate signature of the Contractor, transporter and disposal site.
2. Within 30 calendar days of completion of work, submit a copy of regulated area entry-exit logbooks, copies of personnel monitoring results as required by OSHA, copies of notifications, copies of daily logs, state licenses, worker training certificates as required elsewhere in this document, the Agreement or by law.

1.7 REFERENCE STANDARDS, REGULATIONS AND CODES

A. All work shall be performed strictly according to the requirements of this specification and with the regulations cited in this Paragraph. The Contractor and persons in their employ, shall comply with and be bound to all applicable requirements of law, including without limitation the following federal, state, and local laws, standards, regulations, and codes. These standards and codes shall be by reference be made part of this specification. Whenever regulations are conflicting, the more stringent regulation will prevail.

1. US Department of Labor; Occupational Safety and Health Act of 1970. (Particular attention is drawn to the Asbestos Regulations: CFR Title 29, Part 1910, Sec. 1910.1001 and Part 1926, Sec. 1926.1101, and the Respirator Regulations; CFR Title 29, Part 1910, Sec. 1910.134 and the Hazard Communication Program, CFR Title 29, Part 1910.1200).
2. US Environmental Protection Agency. CFR Title 40, Part 61, Subparts A and M, National Emission Standards for Hazardous Air Pollutants; Asbestos (NESHAP) Revision; Final Rule, dated Tuesday, November 20, 1990.

3. US Environmental Protection Agency. TSCA Title II, Asbestos Hazard and Emergency Response Act (AHERA), 40 CFR Part 763 Subpart E - "Asbestos-Containing Materials in Schools" and also 40 CFR, Part 763, Subpart G - "Worker Protection Rule".
 4. US Department of Transportation. 49 CFR Parts 172 and 173.
 5. All Commonwealth of Massachusetts laws, regulations, and standards, including the following: 453 CMR 6.00, "The Removal, Containment or Encapsulation of Asbestos"; 310 CMR 7.15, "Asbestos"; 310 CMR 18.00 and 19.00; and MGL Chapter 21E.
 6. All Commonwealth of Massachusetts Department of Labor Standards Health & Safety Guidelines for Removal of asbestos.
 7. Other federal, state, and local statutes, ordinances, regulations, or rules pertaining to this specification and the work described herein, including the handling, removal, storage, transportation and disposal of asbestos.
- B. All regulations by these and other governing agencies in their most recent version are applicable. This specification refers to many requirements found in these references, but in no way is intended to cite or reiterate all provisions therein or elsewhere. It is the Contractor's responsibility to know, understand, and abide by all regulations and recommended industry practices. The Consultant or Architect may from time to time during the performance of the work enforce other provisions contained in these references at his own discretion.

1.8 PERMITS AND NOTIFICATIONS

- A. The Contractor shall be responsible for securing and paying associated fees for all necessary permits for asbestos related work, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work by all applicable local, state and federal law and regulations.
- B. The Contractor shall prepare and submit the required notifications, including paying associated fees, to the following agencies. All notifications shall be completed on forms approved by the subject regulatory agency on the day of the award of the Contract. Copies of all required notifications must be submitted to the Consultant prior to commencing asbestos abatement work.
 1. U.S. Environmental Protection Agency,
J. F. Kennedy Federal Building
Boston, Massachusetts 02203
(10 working days in advance)
 2. Massachusetts Department of Environmental Protection
(10 working days in advance)
 3. Massachusetts Department of Labor Standards
(10 working days in advance)
 4. City of Newton Fire Department, City of Newton Police Department, City of Newton Public Health Department and other state or city agencies as required by law or ordinance.

1.9 PROJECT CONDITIONS

- A. Take all measures and provide all material necessary for protecting fixed machinery, controls, instrumentation, equipment, adjacent building occupants and adjacent business operations, from asbestos fibers, dust and debris and from water damage.
- B. Working space and space available for storing materials is restricted within the confines of the limit of work and/or at locations to be designated by the Owner or Consultant.
- C. Post and affix caution signs and labels as required by OSHA regulation, 29 CFR 1926.1101 (k) (1). Post safety signs outside the work project as may be required by the Authority. Obtain two copies of 29 CFR 1910.1001, 29 CFR 1926.1101 (m) 40 CFR 61, Subpart M, and Commonwealth of Massachusetts Regulations 453 CMR 6.00 and 310 CMR 7.00, and post one copy at the job site and retain one copy on file.
- D. Post at the job site, or at the entrance to each independent work area, one copy of all Material Safety Data Sheets (MSDS's) for all chemicals and other substances to be used under this Agreement. These sheets shall be made available for review at the Site upon request.

1.10 GENERAL REQUIREMENTS

- A. All work-site preparations and practices shall be conducted in accordance with all federal, state, and appropriate city and other local laws and regulations. These standards and codes may pertain to demolition, worker protection, and protection of public health and the environment and include current US Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), US Department of Transportation (DOT), Massachusetts Department of Labor Standards (DLS), Massachusetts Department of Environmental Protection (DEP), local and all other Federal, Commonwealth of Massachusetts and local regulations pertaining to asbestos handling, removal, transportation and disposal.
- B. The Consultant will render certain technical services during the work, including without limitation, the services described at 453 CMR. 6.07 (5) and described within this contract. All services performed by the Consultant shall be considered advisory to, and for the sole and exclusive benefit of the Owner. The Owner and his Contractor acknowledge that the Consultant is an independent contractor of the Owner and agree that no act or omission by the Consultant, and no communication by said "Consultant", shall be deemed in any manner to alter or modify the terms of this contract, or to waive any provision hereof, or to bind the Owner, unless specifically agreed upon by the Owner in a signed written instrument.
- C. Prior to use of any design, device, material, method of operation, or process covered by letters patent or copyright, the right for such use shall be secured by suitable legal agreement with the patentee or the Owner of the letters patent or copyright. No arrangement involving letters patent or copyright is acceptable, if subsequent payment for permanent use following completion of the work is required or implied. The Contractor shall be responsible for any liability on the part of the Owner or its representatives that may result from violations by the Contractor.

1.11 PERSONAL PROTECTION

- A. Personal protection, in the form of disposable Tyvek suits, and NIOSH-approved respirators, are required for asbestos abatement workers, Contractor supervision, Consultant, and visitors at the

work site during the set-up, removal, and cleaning operations. Contractor shall provide all required protective equipment for workers, Consultant, and authorized personnel to access this work site.

- B. Each worker shall be supplied with a minimum of two complete disposable uniforms each day. Removal workers shall not be limited to two uniforms, and the Contractor shall be required to supply additional uniforms as is necessary. Under no circumstances will anyone entering the removal area be allowed to reuse a contaminated uniform.
- C. Work clothes shall consist of disposable full body suits, head covers, gloves, footwear, and eye protection.
- D. The Contractor shall supply workers and supervisory personnel with NIOSH approved protective respirators and HEPA/filters. Appropriate respirator selection shall be determined by the daily personnel samples being taken and strictly follow the guidelines set forth in the OSHA respiratory program, 29 CFR 1910.134, and the Massachusetts DLS Regulations, 453 CMR 6.00. The respirators shall be sanitized and maintained according to the manufacturer's recommendations. Appropriate respirators shall be selected using the information provided in OSHA Title 29 CFR Part 1910.1926 Final Rules. PAPR's shall be supplied by the Contractor for all personnel associated with this work. Disposable respirators shall not be considered acceptable in any circumstance. The Contractor shall maintain on site a sufficient supply of disposable HEPA/filters to allow workers and supervisory personnel to change contaminated filters at least three (3) times daily. The Contractor is solely responsible for means and methods used and for compliance with applicable regulations.
- E. Respirators shall be individually assigned to removal workers for their exclusive use. All respiratory protection shall be provided to workers in accordance with the Contractor's written submitted respiratory protection program. A copy of this program shall be kept at the work-site, and shall be posted in the Clean Room of the Decontamination Unit.
- F. Workers must perform negative and positive pressure fit tests each time a respirator is put on, whenever the respirator design so permits. Powered air purifying respirators shall be tested for adequate flow as specified by the manufacturer.
- G. Workers shall be given a qualitative fit test in accordance with procedures detailed in 29 CFR 1910.134 – Appendix A for all respirators to be used for asbestos abatement under this Contract. An appropriately administered quantitative fit test may be substituted for the qualitative fit test.
- H. Upon leaving the active work area, pre-filters shall be discarded, cartridges removed, and respirators cleaned in disinfectant solution and clean water rinse. Clean respirators shall be stored in plastic bags when not in use. The Contractor shall inspect respirators daily for broken, missing, or damaged parts.
- I. Contractor shall provide daily personal sampling to check personal exposure levels for the purpose of establishing respiratory protection needs. Samples shall be taken for the duration of the work shift or for eight hours, whichever is less. Personal samples need not be taken every day after the first day if working conditions remain invariant, but must be taken every time there is a change in the removal operation, either in terms of the location or the type of work. Sampling will be to determine eight-hour Time-Weighted-Averages (TWA). The Contractor is responsible for personal sampling as outlined in OSHA Standard 1926.1001.

- J. Sampling personnel shall be proficient in the taking of air samples under NIOSH 7400, and must be supervised by an individual who has completed the training course NIOSH 582 or equivalent.
- K. Air sampling results shall be available at the job site in written form no more than twenty-four (24) hours after the completion of a sampling cycle. The document shall list each sample's result, sampling time and date, person monitored, flow rate, sample duration, microscope field area, number of fibers per fields counted, cassette size and analyst's name and company. Air sample analysis results shall be reported in fibers per cubic centimeter.

1.12 WORK PROCEDURES

- A. In order to avoid possible exposure to dangerous levels of asbestos, and to prevent possible contamination of areas outside the demarcated work zone, work shall follow the guidelines listed below.
 - 1. At no time shall a worker entering the containment area go further than the Clean Room of the Decontamination Unit without a respirator and protective clothing.
 - 2. Before leaving the work area, the worker shall remove all gross contamination and debris from the coveralls. In practice, this is carried out by one worker assisting another.
 - 3. All equipment used by the workers inside the demarcated work zone shall be either left in the Dirty Room of the Decontamination Unit or thoroughly decontaminated before being removed from the area. Any extra work clothing (that is in addition to the disposable garments supplied by the Contractor) shall be left in the Dirty Room of the Decontamination Unit until the completion of work in that area.
 - 4. As stated in Paragraph 3.02 B. (Decontamination Unit and Procedures), all persons leaving the removal area must shower before leaving the containment.
 - 5. Under no circumstance shall workers or supervisory personnel be allowed to eat, drink, smoke, chew gum, or chew tobacco in the work area. To do so shall be grounds for the Consultant to stop all removal operations. Only in the case of life threatening emergency shall workers or supervisory personnel be allowed to remove their protective respirators while in the work area. In this situation, respirators are to be removed for as short a duration as possible.
 - 5. As with additional clothing, all footwear shall be left inside the work area until the completion of the job, then cleaned or discarded.

1.13 SPECIAL CONSIDERATIONS

A. Final Air Clearance Tests

All final air tests will be performed by the Consultant in accordance with Massachusetts Department of Labor Standards (DLS) regulations at 453 CMR 6.00. The Contractor shall provide 110 volt power throughout the work area as required to operate fans and Consultant's sampling equipment. The first set of final clearance air tests for each removal area will be paid for by the Owner. In the event that these air tests do not pass the clearance criteria, any subsequent air tests that need to be performed shall be paid for by the Contractor. All additional sampling costs will be automatically deducted from the Agreement Price until the areas in question pass the final air clearance criteria of less than 0.010 fibers per cubic centimeter for Phase Contrast Microscopy (PCM) clearance testing or an average of or 70

structures per square millimeter for TEM clearance testing. The number of air samples will be determined in accordance with Massachusetts DLS regulations at 453 CMR 6.00. At least one sample for each 500 linear/1000 square feet of asbestos or portion thereof, or one sample per room, whichever is greater shall be collected and analyzed. The collection and analysis of all PCM samples shall be in accordance with the NIOSH 7400 Method.

B. Exceptions to Work Area Preparation Requirements

1. In accordance with 453 CMR 6.14 (2) (a) (7), it will not be required to cover impervious surfaces of walls or floors with two (2) layers of polyethylene sheeting. Examples of such surfaces that may be considered to be impervious include concrete floors without any cracks or fissures and glazed walls, i.e., painted brick walls. (Note: Wooden surfaces and surfaces constructed of stone/cement are not considered impervious). If the Contractor wishes to utilize this exception, Contractor shall be required to state on his notification forms that he does not intend to use two (2) layers of polyethylene sheeting for these particular surfaces, identifying with specificity those areas. If the DLS does not permit this exception, Contractor shall be required to use two (2) layers of polyethylene sheeting in full accordance with the work area preparation requirements of this document, and will not be entitled to any additional payment.

C. Additional Considerations

1. Security

- a. The Owner will provide specific access as required during the project to the Contractor and personnel assigned to the project. The Contractor shall be responsible for the security of the section of the building involved in the abatement project. It shall also be the Contractor's responsibility to allow only authorized personnel into the work area, and to secure all assigned entrances and exits at the end of the work day.
- b. Any person entering or leaving the contained areas must sign the Contractor's bound log book and enter the date and time. The log book must be located immediately outside the entrance to the Decontamination Unit at all times, and be open for inspection by the Consultant at all times.

PART 2 - PRODUCTS

Contractor shall furnish all supplies, materials and equipment to execute the work described herein including, but not limited to the following:

2.1 ASBESTOS ABATEMENT SUPPLIES

- A. Respirators: Respirators shall be selected from those jointly approved by the National Institute for Occupational Safety and Health (NIOSH), US Department of Health and Human Services and the Mine Safety and Health Administration (MSHA), and US Department of Labor. If the Contractor elects to use supplied air respiratory protection, provide three compatible full facepiece respirators for use by the Consultant and other approved visitors.
- B. Surfactant (Amended Water): All water to be used for removal and wet wiping of asbestos-contaminated materials during abatement operations shall be amended through the addition of a surfactant (a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent) mixed and supplied in accordance with manufacturer's instructions.

- C. Sealer: All surfaces from which asbestos-containing materials have been removed shall be sealed with a colored-asbestos sealer, mixed and applied in accordance with manufacturer's instructions. The proposed brand and product shall be submitted to the Consultant for approval.
- D. Polyethylene Sheeting: All polyethylene sheeting used on the Contract shall be fire resistant, and shall meet and be approved as called for in local Fire Prevention Codes
- E. Encapsulant: All encapsulant shall be a bridging encapsulant such as Childer's Product Co., Chilcare CP215 bridging encasement/encapsulant; Barrier Systems Inc., Slaytex Asbestos Encasement System; CRSI/ISP Guardian Bridging encapsulant; IPC Serpiflex shield encapsulant; or equivalent. The proposed brand and product shall be submitted to the Consultant for approval.
- F. Plaster impregnated glass-fiber cloth.
- G. Mastic Remover - Sentinel 747, or approved equal
- H. Fans and leaf blowers - Provide power as required for performing aggressive clearance air sampling in accordance with the applicable regulations.

PART 3 - EXECUTION

3.1 SEQUENCE OF WORK

- A. The following is a typical sequence of work that Contractor shall adhere to during the asbestos abatement project. Consultant may authorize deviations from this typical sequence based upon the specific conditions encountered during the project. Sequencing of other related work must be coordinated with the Owner and Consultant. Contractor must determine sequence of work activities to accommodate the requirements outlined in related Sections listed in 1.03 of this specification. The sequence of work provided below is strictly for asbestos work only, and the Contractor is responsible for proposing an abatement plan that addresses the sequence of all work in related Sections.
 - 1. Contractor shall post all required signage.
 - 2. Contractor shall secure area from unauthorized access.
 - 3. Contractor shall cover all immovable objects and objects not removed from the work area with two (2) layers of six (6)-mil polyethylene sheeting, sealed airtight with duct tape. Contractor shall install critical barriers at all points of access required by regulations.
 - 4. Contractor shall seal all rooms which do not contain ACM with two layers of six-mil polyethylene sheeting sealed airtight with duct tape.
 - 5. Contractor shall install HEPA filtration units, as required by this specification, sufficient to achieve a minimum of four (4) air changes per hour. All units shall exhaust to the outside of the building.
 - 6. Contractor shall construct decontamination unit, and any other construction needed to complete the work area to the satisfaction of the Consultant.

7. Consultant shall inspect and approve all work area preparations before permitting Contractor to begin removal work.
8. Contractor shall construct demising barriers according to the provisions as set forth in this specification, as deemed necessary, and at the direction of the Consultant, if ceiling and wall voids are accessed during abatement activities.
9. Contractor shall perform pre-cleaning of floor and wall surfaces in locations where damaged ACM and debris is present. Other required pre-cleaning should be coordinated with the scope of work in related Sections.
10. Contractor shall properly remove and dispose of all asbestos-containing materials and asbestos-contaminated materials as required by these Specifications.
11. Contractor shall decontaminate the work area upon completion of removal.
12. The Consultant shall perform a final visual inspection to assure that no visible debris exists in the work area. Contractor shall re-clean the work areas as needed until they pass a visual inspection by Consultant.
13. Contractor shall encapsulate all surfaces in the work area.
14. The Consultant will perform final air clearance testing in each work area containment. Satisfactory results are required before containment may be removed.
15. Contractor shall remove all work area barriers, equipment, polyethylene sheeting, etc. and clean any areas to the satisfaction of the Consultant.
16. Contractor shall submit waste shipment records as required not more than thirty days after completion of asbestos removal work.

B. Approvals and Inspection

1. All temporary facilities, work procedures, equipment, materials, services, and agreements must strictly adhere to and meet the requirements of these Specifications along with EPA, OSHA, NIOSH, regulations and recommendations as well as any other Federal, State, and local regulations. Where there is overlap of these requirements and regulations, the most stringent one applies. All work performed by the Contractor is further subject to approval of the Consultant.
2. Modifications to these isolation and sealing methods, procedures, and design may be considered if all elements of proper and safe procedures to prevent contamination and exposure can be demonstrated. Written modifications to the requirements of this specification must be made to the Consultant for review before they can be used for work under this Agreement.

C. Barriers and Isolation Areas

1. The Contractor shall construct and maintain suitable critical barriers within the building to separate asbestos abatement work areas from other spaces in the building. Critical barriers shall be of sufficient size and strength to prevent others from entering the work areas. Critical barriers shall be constructed at all hallways, doorways, grille openings, or other open entrances

to the work area. Any seams in the critical barriers shall be sealed airtight with caulking or an approved equal method. These barriers shall be removed and disposed of by the Contractor at the completion of abatement work.

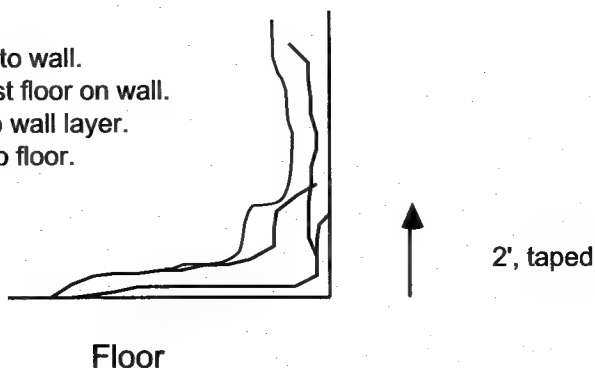
2. Warning signs as required in 29 CFR 1926.1101 shall be posted on the entrance to all work areas.
3. The signs shall be posted at the perimeters of asbestos removal, demolition, or construction areas where the asbestos-containing material and asbestos-contaminated material to be removed exists.
4. The Contractor shall maintain all temporary and critical barriers, facilities, and controls as long as needed for the safe and proper completion of the work. Any breaches in the containment shall be corrected at the beginning of each shift and as necessary during the workday. Work will not be allowed to commence until all control systems are in place and operable.
5. No barriers shall be removed until the work areas are thoroughly cleaned, all debris has been properly bagged and removed from work areas, and the air has passed final clearance tests, in accordance with provisions detailed herein.

3.2 ACM WORK AREA PREPARATION AND REMOVAL

A. Preparation:

1. **Primary Barriers:** Prior to construction of the asbestos removal area, all primary barriers shall be sealed with a minimum of one layer of six (6)-mil plastic sheeting and duct tape. Primary barriers consist of all windows, vents, closed and locked doors, and openings to adjacent spaces from the work area. HVAC systems shall be sealed, where applicable, as described previously with two layers of 6-mil polyethylene sheeting.
2. **Critical Barriers:** Critical barriers consist of the boundaries of the work area including floors, walls, and any constructed barrier to restrict public access to the work area. Floors, where applicable, shall be sealed with a minimum of two layers of six (6) mil polyethylene sheeting. There shall be a minimum overlap of two feet (24") at the floor seams and the sheeting shall run a minimum of two feet (24") up the walls.
3. The containment walls shall be constructed using a minimum of two layers of six-mil polyethylene sheeting after sealing the floors. This shall be done using a minimum of one layer of six-mil polyethylene sheeting. Overlaps between the walls and floors shall be interwoven as follows:
 - a.. The first floor layer shall be taped up the wall a minimum of two feet (24"). The first wall layer shall be sealed to the floor layer at the corner of the floor and wall. The second floor layer shall be sealed to the first wall layer at a minimum of a two foot (24") overlap. The second wall layer shall cover all overlaps and be sealed to the floor.

First floor layer, taped to wall.
 Wall layer, taped to first floor on wall.
 2nd floor layer, taped to wall layer.
 2nd wall layer, sealed to floor.



4. The enclosure shall be constructed so as to allow the removal of interior layers of plastic without damaging the exterior layer. The exterior layer shall stay intact for the duration of the project and be designated the critical barrier.
5. Adequate protection of the subfloor is required throughout the project in order to maintain negative pressure work area containments, and to avoid damage to the subflooring system. The Contractor shall propose method of subfloor protection in their abatement plan.

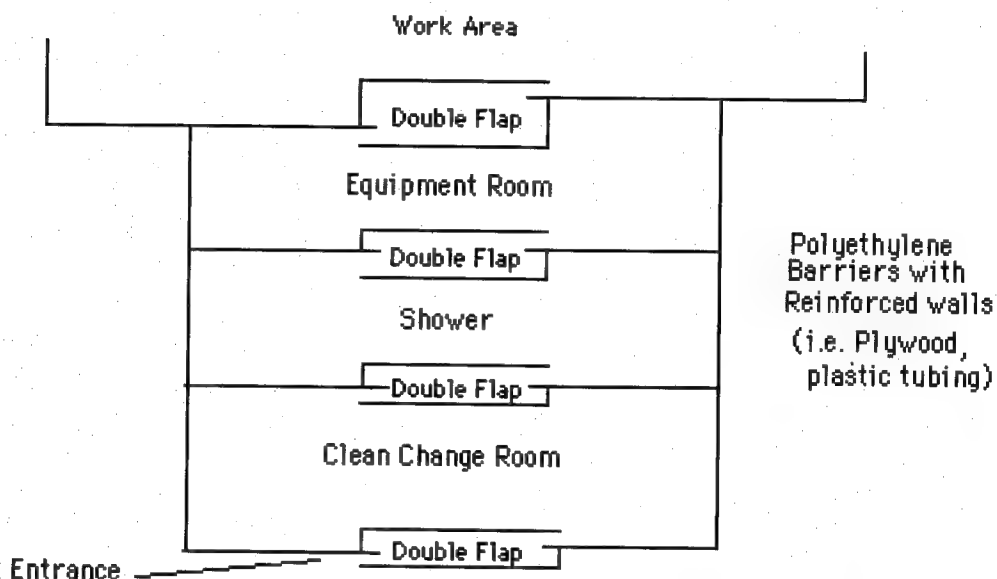
B. Decontamination Unit and Procedures

1. It is the Contractor's responsibility to provide decontamination chambers consisting of an Equipment Room, Shower Room, and Clean Room for personnel involved in asbestos handling and removal. Each of the three rooms shall be of sufficient size to accommodate authorized personnel and related equipment. Each room shall be separate of other rooms by a double flap of 6-mil polyethylene sheeting acting as an airlock. This shall be designed to minimize fiber migration and air flow between the decontamination unit rooms. The rooms shall be rigidly framed with 2"x4" lumber or equal (e.g. plywood, plastic tubing, etc.), masked, sealed and attached to the entry/exit ways of asbestos work areas. The three rooms together shall be referred to as the Decontamination Unit. A Decontamination Unit shall be required for each separate containment area, if work is to be divided into sections.
2. The Equipment Room shall serve as a transfer room and an intermediate area between the work area and any decontamination procedures to occur in the shower room. This room shall be vacuumed and washed whenever necessary in order to prevent asbestos dust and debris accumulations or when required by the Consultant. The Equipment Room will also serve as an access area to the shower for personnel leaving the work area. Workers leaving the containment area shall remove and dispose of disposable protective suits and wear only respirators into the Shower. At the end of each day, bags of asbestos waste and contaminated materials shall be removed after a thorough decontamination procedure as described elsewhere in this specification. Workers performing this operation shall wear respirators and disposable full-body protective suits.
3. The Shower Room shall have a continuous supply of cold and hot water, and be suitably arranged for complete showering during decontamination. The Shower Room with curtained doorways will comprise an airlock between contaminated and clean areas. All materials being passed from the equipment room to the clean room must pass through the shower and be thoroughly decontaminated. The shower floor will not be allowed to sit at ground level, but must be elevated a minimum of six inches off of the floor with a suitable catch basin for drainage into a filtration system. The shower shall be equipped with a sump pump and an in-

line two stage filter. The first stage shall efficiently filter fibers greater than twenty (20) microns in length and the second stage shall filter bulk material and fibers greater than five (5) microns in length. Alternatively, shower water may be re-routed back into the work area to be bagged and disposed of as asbestos contaminated waste. The Contractor shall provide disposable towels and soap in the shower area.

4. The Clean Room shall store asbestos worker's clean protective clothing and clean respirator equipment. Contaminated clothing, respirators, tools, equipment, or other materials shall not be allowed into the Clean Room or beyond. The Clean Room shall serve as an access for personnel entering the work area, and for the donning of respiratory protection and protective clothing. The Contractor shall provide space in the clean room for the worker's personal clothing. This may be in the form of hangers or lockers.

TYPICAL DECONTAMINATION UNIT



5. The above decontamination enclosure is called a "three-stage" decontamination enclosure and shall be the type constructed and used for this project in specified areas. A "two-stage" unit resembles the "three-stage" unit in construction detail, but it is built without a shower section.
- C. HEPA Filtration: Adequate negative pressure shall be provided within the enclosure as specified below.
1. After the work area is totally isolated, and prior to commencement of work, the Consultant will perform a visual inspection of the work area. This will consist of checking the integrity of barriers including smoke testing the containment if deemed necessary by the Consultant. This does not in any way relieve the Contractor's responsibilities to ensure the isolation of the work area. The volume of air within the contained work area shall be changed a minimum of four (4) times per hour. A pressure differential reading of 0.02 inches of water shall be maintained in the negative pressure work area relative to adjacent areas. Equipment used for producing a negative pressure work area shall have a filtering device which is at least 99.97% efficient at a 0.3 micron pore size. Filters meeting these standards are referred to as High Efficiency Particulate Air (HEPA) filters.

2. The HEPA filtration units shall be equipped with the following:
 - a. Magnehelic gauge to monitor the unit's air pressure difference across the filters and be able to interpret magnehelic reading to cubic feet per minute (CFM).
 - b. An affixed label, clearly marked and conspicuous, showing the most recent installation date and hour reading of the primary internal HEPA.
 - c. A clock to record the unit's operation time.
 - d. Automatic shut off for filter failure or absence.
 - e. Audible alarm for unit shutdown.
 - f. Amber flashing warning light for filter loading.
 - g. The unit must be equipped with a safety system which prevents it from being operated with the HEPA filter in an improper orientation.
 - h. All flexible ducting, vent tubing, adapter plates and other equipment used for the passage of filtered air shall be undamaged, uncontaminated, and free of air leaks at all points.
3. Pre-filters shall be changed frequently during the removal.
4. Air movement shall flow uninterrupted from outside the work area through the Decontamination Unit into the work area. There shall be no other openings for air to enter the containment unless approved by the Consultant in writing.
5. HEPA filtration units shall be placed as far as possible from the air intake to the containment to prevent short-cycling of fresh air.
6. This containment, along with the decontamination chamber, shall constitute the critical containment of the work area from the surrounding areas. All openings to this critical containment are to be sealed except where air must enter the worksite due to the use of exhaust equipment. Unless approved by the Consultant, air shall enter the critical containment only through the Decontamination Unit.
6. Modifications to these isolation and sealing methods, procedures, and design may be considered if all elements of proper and safe procedures to prevent contamination and exposure can be demonstrated. Written modifications to the requirements specified herein must be made to the Consultant for review before they can be used for work under this Contract.

D. ACM Removal

1. Asbestos removal shall not begin until the Consultant has given verbal or written authorization to proceed. This authorization will be given after the removal area has passed a visual inspection by the Consultant based on the criteria presented herein.
2. All asbestos-containing material must be soaked with amended water before removal. The material shall be sufficiently saturated to reduce fiber release so that the airborne fiber

concentration does not exceed the established OSHA Permissible Exposure Limits, (PEL's). The amended water shall not be applied in amounts that will cause leakage or runoff of contaminated water from the removal area. Dry removal will not be permitted during this contract.

3. Asbestos-containing material and asbestos-contaminated material shall be carefully removed and placed immediately into bags. Bags must be filled with water to the point where all asbestos is adequately wetted as defined by Federal Regulations 40 CFR 61 Subpart M. Asbestos shall not be permitted to let fall or sit on the ground before being bagged.
4. Fine cleaning of residual asbestos-containing material shall consist of carefully scraping or brushing the material from surfaces. The recommended method for brushing a substrate after gross removal has taken place is to use a nylon brush. Wetting of the substrate shall also occur while this brushing is performed, since the chance of airborne fiber generation during fine cleaning still exists.
5. Water Atomizing Devices, commonly termed "mistlers," shall be utilized by the Contractor during asbestos removal and fine cleaning phases to provide further dust control protection in the work area. The mistlers shall be supplied with amended water and in operation continuously during these phases.
6. Asbestos waste must be double bagged before it is removed from the contained area. The inner bag shall be HEPA vacuumed and showered before being placed in the outer bag. Vacuuming must take place in the Equipment Room of the Decontamination Unit. Washing must take place in the Shower Room of the Decontamination Unit. Bags shall be removed at the end of each working day and transported from the job site, if feasible.
7. Any materials considered contaminated by the Consultant that cannot be double bagged shall be wetted and containerized in disposal drums. Oversized contaminated materials shall be wrapped airtight in two layers of 6-mil polyethylene sheeting.
8. All bags, containers or wrapped materials transported out of the work area shall be labeled with preprinted labels required by Federal EPA, OSHA and the Department of Transportation regulations. Any carts used to transport asbestos waste to the on-site holding dumpster should be HEPA vacuumed and wet wiped each day, and may be inspected by the Consultant every day.
9. Carts that are not made of an impermeable material shall be lined with a minimum of one layer of 6-mil polyethylene sheeting to be removed after each shift and disposed of as contaminated waste. The transport route and the transport of waste out of the work area shall be coordinated with the on-site Consultant.
10. The work area shall be cleaned of residual asbestos debris on a daily basis. The Decontamination Unit floor (top layer) shall be picked up and replaced on a daily basis.
11. Air testing will be performed continuously outside the enclosed area. If fiber concentrations exceed 0.010 fibers/cc or background levels, work shall stop and the Contractor shall perform clean-up activities in the affected areas and check the integrity of the critical barriers. Clean up activities shall include but not be limited to wet wiping and vacuuming surfaces with a HEPA equipped vacuum. Work may continue only after the source of contamination is identified, corrected, and proper cleaning activities are implemented. Air testing will be

performed by the Consultant on site in the affected areas. If the results of these air tests are not below 0.010 fibers/cc, the Contractor shall perform a thorough decontamination of the affected areas.

12. After brushing and scraping, surfaces shall be free of visible debris and fibers. A final wipe-down of the substrate with wet, lint-free rags shall take place in order to ensure proper cleaning. All surfaces including floors, walls, and ceilings shall also be HEPA vacuumed clean. All visible asbestos-containing material is to be removed by the Contractor before encapsulation procedures are allowed to begin. The Consultant will perform an inspection of the work area prior to giving approval to begin encapsulation of work area. Removal substrate must be clean and bare, and the entire work area must be free and clear of any suspect material for the Contractor to pass this visual inspection and begin encapsulation.

E. Glove Bag Removal Method

Prior to installation of glovebags, the Abatement Contractor is responsible for exploratory demolition to locate the pipe wraps concealed behind walls and ceilings. Removal of asbestos containing pipe fitting/wrap insulation shall be in accordance with the following procedure:

1. Glove bags may be used as a method of asbestos removal as an alternative to total isolation removal or in conjunction with total isolation removal in areas identified in the scope of work for pipe insulation removal, but only if the area will be unoccupied during all phases of abatement. Several restrictions, which apply to the use of glove bags for asbestos removal purposes, may be found at OSHA Regulations 29 CFR 1926.1101.
2. Contractor shall set up a containment barrier around the immediate area of glove bag removal. This containment is to consist of two layers of six (6)-mil polyethylene sheeting walls and a two layer six-mil polyethylene sheeting floor forming a fully enclosed "cocoon"-like work area enclosure.
3. As an alternative to the "cocoon" enclosure described above, Contractor is permitted to erect a containment enclosure where all openings, windows, vents, and doors in the work area are sealed with two layers of six-mil polyethylene sheeting and duct tape. In addition, walls adjacent to the piping, floor surfaces below the piping, and any object in the work area shall be covered with two layers of six-mil polyethylene sheeting.
4. In either case, the containment area surrounding the glove bag area shall be under adequate negative pressure to achieve a minimum of four air changes per hour. Criteria for filtering and exhausting the work area shall be the same as in the total isolation method for removal.
5. Pipes and fittings where glove bags are to be used must be no warmer than 150°F, as the glove bag material may melt or stick to the pipes.
6. All workers must wear full protective suits and respirators during all phases of glove bag work, including preparation, removal, clean up, and encapsulation.
7. Preparation of the area will include a minimum double-stage Decontamination Unit at the entrance to the contained area, equipped with a HEPA vacuum for personal decontamination, in accordance with OSHA 1926.1101. Glove bags will be placed on pipes or fittings and securely taped with tools enclosed. Bags will not have any holes that might allow air to escape during removal. Bags will be checked with smoke tubes provided by Contractor. A HEPA

vacuum will be inserted through the appropriate hole in the bag along with the nozzle for the water sprayer containing amended water. When such preparations are completed, approval of the Consultant will be obtained for each glove bag work area before removal begins.

8. It is required (per OSHA) that two-person (minimum) teams perform glove bag removal. One will support the vacuum and assist with wetting the material in the bag while the other does the actual cutting of the material. Once the material is removed and the pipes are clean and bare, the material in the bag will be thoroughly wetted down and forced to the bottom of the bag. All air in the bag will be vacuumed out, and the bottom portion of the bag where all the asbestos must be located will be twisted around before separating the bag from the pipe. Bags will then be immediately placed in another labeled bag for disposal purposes. Glove bags shall not be left in the work area for any length of time after the removal.
9. All surfaces in the glove bag removal area will then be wet-wiped and HEPA- vacuumed. Polyethylene sheeting used to protect the immediate area will be discarded as asbestos waste. Enclosure barriers will be left up until results of clearance air samples are acceptable. Contractor will encapsulate the pipes and fittings for Consultant inspection.
10. Lock-down must be performed with a pre-approved encapsulant, after the pipe is essentially dry. Workers performing lock-down must wear disposable protective clothing and suitable respirators. The lock-down material shall be applied with a low-pressure (less than 500 psi), airless, spray-type mechanism or be hand-applied. A minimum of one coat of lock-down encapsulant will be applied. The lock-down encapsulant will be applied to both the substrate and the polyethylene sheeting, if in place. If the lock-down material is being applied to irregular, grooved, or corrugated surfaces, it should be administered from the opposing side or at a right angle to the direction of the previous application.
11. Personal samples, containment area samples taken during glove bag operations, and/or final clearance air samples must not exceed 0.010 fibers/cc or background levels. If this occurs, the area inside the containment must be thoroughly cleaned and encapsulated. Clearance air samples will then be taken with acceptance criteria of 0.010 f/cc required before the enclosure can be dismantled.

F. Removal of Critical Barriers

1. No critical barrier shall be taken down until the final visual inspection and final clearance air tests are found to below 0.010 fibers/cc.
2. After a successful final visual inspection, encapsulation, and a successful final air test, Contractor shall perform post abatement take-down.
3. All encapsulated polyethylene sheeting used in the construction and operation of the Decontamination Unit and Containment Area shall be bagged and disposed of as asbestos contaminated waste. Areas exposed during this process shall be examined for traces of suspect material. If any is found, it shall be picked up by HEPA vacuuming and wet cleaning, and a coat of encapsulant shall be applied to the affected areas. Based on the amount of suspect material found, the Consultant may request the use of misters in the surrounding area. The Contractor shall then implement the use of misters as a precautionary measure.

G. Encapsulation Procedures

1. The polyethylene barriers shall be cleaned of gross contamination before a lock-down sealant can be applied to the substrate. After the substrate has been cleaned and all polyethylene barriers of the work area are cleaned of all visible debris, the Contractor shall request a visual inspection of the work area by the Consultant. Prior to the inspection of the work area, the Contractor shall remove the inside layer of the work area polyethylene sheeting, after cleaning, and dispose of it as contaminated waste. The work area shall still have all primary barriers intact and one layer of polyethylene sheeting over floor, walls, and permanent structures within the work area during the inspection.
2. Workers performing lock-down must wear disposable protective clothing and respirators suitable for asbestos. The encapsulation process shall not be treated any differently from the removal process in this respect.
3. The lock-down material shall be applied with a low pressure (less than 500 p.s.i.), airless spray-type mechanism.
4. All surfaces in the work area shall be encapsulated. A minimum of one coat of lock-down encapsulant shall be applied to prevent the generation of airborne residual fibers. The lock-down encapsulant shall be applied to both the substrate and the polyethylene sheeting serving as the containment barrier. During the encapsulation process, the Contractor shall decrease the negative pressure of the work area by shutting down some of the air filtration devices in the work area. If the lock-down material is being applied to irregular, grooved, or corrugated surfaces, it shall be administered from the opposing side, or at a right angle to the direction of the previous application. The encapsulant shall be left to dry before the commencement of final air testing. After final air clearance and inspection criteria have been met (see Paragraph 3.11 regarding Final Clearances), the Contractor shall begin final take-down procedures.

3.3 VAT/SHEET FLOOR COVERING MASTIC REMOVAL METHOD

- A. Removal of vinyl asbestos floor tiles (VAT)/sheet floor covering including removal of any asbestos-contaminated materials, including, but not limited to, additional layers of floor tiles and mastic, flooring paper, contaminated plywood sub-floor, leveling compound, and contaminated hardwood floors shall be in accordance with all applicable regulations including Part II, Department of Labor – Occupational Safety and Health Administration, 29 CFR Parts 1910, et. al., dated Wednesday, August 10, 1994. At a minimum, the following work practices shall apply:
 1. Workers shall wear protective clothing and half-mask, dual-cartridge, HEPA-filtered respirator, at a minimum.
 2. The work area shall be isolated as required by regulations and to the satisfaction of the Consultant. As a minimum, critical barriers, a negative pressure system, and a personal decontamination facility shall be erected in accordance with Section 3.02 of this Section. All areas where VAT/sheet floor covering are to be removed shall be sealed off by the use of polyethylene sheeting on all openings and HEPA filtered negative pressure shall be established in each work area sufficient to achieve four air changes per hour.
 3. VAT/sheet floor covering shall be wet prior to removal and during removal.

4. Each tile shall be removed as a complete unit, with no breakage, wherever possible. Contractor shall remove any carpeting prior to removal of asbestos-containing flooring materials. It is the intention of the asbestos abatement scope of work to remove all layers of ACM flooring materials as well as any asbestos-contaminated materials down to the base substrate.
5. The exposed floor will be cleaned with a HEPA vacuum cleaner and wet-scraped. Repeat the process until the floor area is clean and smooth.
6. Grinding of mastic if applicable, is not permitted unless work is being performed under the 'Total Isolation Method'.
7. Any chemicals to be used for removal of the mastic must be approved by the Consultant, Owner and General Contractor prior to being used.
8. Dispose of VAT/floor covering/mastic in a DEP-approved landfill that legally accepts this type of waste.

3.4 DOOR AND WINDOW CAULKING REMOVAL METHOD

- A. Removal of asbestos-containing door and window caulking/glazing compound material shall be in accordance with all applicable regulations including Part II, OSHA, 29 CFR Parts 1910, et al., dated August 10, 1994. At a minimum, the following work practices shall apply:
 1. Workers shall wear protective clothing and half-mask, dual-cartridge, HEPA-filtered respirator, at a minimum.
 2. The work area shall be isolated as required by regulations and to the satisfaction of the Consultant. As a minimum, critical barriers, and a remote personal decontamination facility shall be erected in accordance with Section 3.02 of this Specification. Windows shall be removed as an entire unit.
 3. Place polyethylene sheeting below area where door/window unit is being removed, both inside and outside the building.
 4. Using wet methods, remove the window/door caulking and glazing compound in a manner which precludes the material from becoming friable.
 5. Properly decontaminate all non-ACM materials in contact with the asbestos-containing material. All non-ACM materials in contact with the asbestos-containing, not properly decontaminated, shall be wrapped in two layers of six-mil polyethylene sheeting and disposed of as asbestos contaminated waste.
 7. Properly wet and double bag all ACM, and all non-ACM materials contaminated with asbestos for disposal as ACM debris.
 8. Where the specified door/window components can be removed and disposed of whole, the entire door/window component (e.g., door frame, window sash, window frame) may be removed and wrapped in two layers of six-mil polyethylene and disposed of as ACM. As an alternative to disposal of the entire component, the ACM contaminated portion of the components may be removed and disposed of, provided that cutting or abrading or

other process that will render the ACM friable, does not occur. Upon completion of the whole door/window unit and removal of door/window frames, caulking between door/window frame and building masonry shall be assumed present at all door/window removal locations and removal of this material as ACM is included in the Asbestos Abatement scope of work for this site.

9. Using a HEPA vacuum remove and clean all residual asbestos-containing window glazing debris remaining in the work area.
10. Dispose all asbestos-containing waste in an EPA and DEP approved landfill.

3.5 REMOVAL AND DISPOSAL OF CATEGORY I NON-FRIABLE ASBESTOS-CONTAINING ROOFING MATERIALS

A. Because roofing material is classified as non-friable material, regulations for the removal of roofing material are less stringent if certain procedures are followed. Category I non-friable asbestos-containing roofing materials shall be removed from the roof and disposed in accordance with all regulations of applicable federal, state and local authorities concerning roofing materials, including the Interpretive Rule for Roof Removal Operations under the Asbestos NESHAP (40 CFR 61, Appendix A to Subpart M) and the DEP Requirements for Removal of Asbestos-containing Asphaltic Roofing and Siding Materials (310 CMR 7.15 (10)). If these provisions are followed, as outlined below, the asbestos-containing asphaltic roofing and siding may be disposed of in any landfill permitted by the DEP to accept solid waste pursuant to 310 CMR 19.000, Solid Waste Management. If the asbestos-containing asphaltic roofing and siding are not handled in accordance with this section or if the DEP has determined that asbestos fibers may be released during handling, removal or disposal, then the roofing materials shall be disposed of in a landfill that has obtained a special waste permit to accept asbestos wastes. In addition, the following minimum work practices shall be adhered to:

1. Roof level heating and ventilation air intakes shall be isolated by covering the intakes with 6-mil thickness plastic sheeting prior to the start of removal work.
2. Asphaltic shingles and felts shall be removed intact to the greatest extent feasible.
3. Asphaltic shingles and felts that are not intact or will be rendered non-intact by removal shall be adequately wet during removal.
4. Where cutting machines are used in the removal of asphaltic shingles and felts, said cutting machines shall be equipped with a HEPA vacuum to capture dust produced by the cutting process. Cutting machines that are not equipped with a HEPA vacuum to capture dust produced by the cutting process shall only be used inside a work area for which containment sufficient to prevent visible emissions of fugitive dust to the ambient air has been established.
5. Where cutting machines are used in the removal of asphaltic shingles and felts, the material shall be adequately wet during the cutting process.
6. Dust produced by power roof cutter operating on aggregate surfaces shall be removed by HEPA vacuuming. Dust produced by power roof cutting on non-aggregate, smooth surfaces shall be removed by HEPA vacuuming or wet wiping along the cut line.

7. Asbestos-containing shingles or felts shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground by crane or hoist or transferred in dust-tight chutes.
 8. Intact asphaltic shingles and felts shall be lowered to the ground prior to the end of each work shift. Non-intact asphaltic shingles and felts shall be kept adequately wet at all times while on the roof. Non-intact asphaltic shingles and felts shall be placed in an impermeable waste bag (6-mil thickness) or wrapped in plastic sheeting (minimum of 6-mil thickness), sealed with duct tape or equivalent, and lowered to the ground prior to the end of each work shift.
 9. For activities that disturb friable ACM, no visible emissions shall be discharge to the outside air during the collection, processing, packaging, or transporting of any ACM or ACWM.
 10. Personnel air monitoring of asbestos abatement workers, which demonstrates compliance with the provisions of OSHA 29 CFR 1926.1101 (f), may be used in lieu of clearance air sampling requirements.
- B. All ACM roofing material and resulting ACWM must be completely removed from the roof deck, to the satisfaction of the Consultant, prior to installation of replacement roofing.

3.6 DISPOSAL OF ASBESTOS WASTE

- A. Waste removal procedure shall be done in accordance with all regulations as set forth by the agencies having authority to regulate.
- B. The Contractor shall provide proof at the time of the pre-construction meeting that disposal sites for the waste materials have current and valid permits to receive asbestos waste.
- C. Receipts shall be obtained by the Contractor from the disposal site(s), and submitted to the Owner upon request for final payment.
- D. Warning labels having permanent, waterproof print and adhesive shall be affixed to all bags, trucks, drums (lids and sides), and other containers used to store and/or transport asbestos-containing material. All labels shall comply with applicable MA DEP, DOT, EPA, and OSHA requirements.
- E. The Contractor shall be responsible for all necessary precautions to prevent pollution by spilling, or overflow, or other releases during the performance of services and shall assume full responsibility for all Contractor caused spills or releases, which shall be cleaned up at the Contractor's expense.

3.7 HOUSEKEEPING

- A. Throughout the work period, the Contractor shall maintain the building and site in a standard of cleanliness as specified throughout these Specifications.
 1. Contaminated disposable clothing, respirator filters, and other debris shall be bagged and sealed at the end of each work day and removed from the site.

2. All asbestos waste generated by removal activities, shall be bagged immediately and removed from the site on a daily basis, if feasible.
3. Respirators shall be thoroughly cleaned at the end of each work day and stored for the next day's use.
4. The Contractor shall retain all stored items and equipment in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection materials.
5. The Contractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for completion of the work.
6. The Contractor shall provide adequate storage for all items awaiting daily removal from the job site, if feasible, observing all requirements for fire protection and protection of the environment.
7. Daily, and more often if necessary, the Contractor shall inspect the work areas and adjoining spaces, and pick up all scrap, debris, and waste material. Remove all such items to the equipment storage area.
8. The Contractor shall maintain the site in a neat and orderly condition at all times.

3.8 AIR MONITORING AND WORK AREA CLEARANCE BY CONSULTANT

- A. Background (pre-testing) air samples may be taken to represent conditions before the Contractor starts masking and sealing operations.
- B. During removal, area samples will be collected by the Consultant outside major openings in the containment: in the clean room, at other critical points outside the work areas, just outside the clean room, inside the contained work sites, and at HEPA exhaust locations. Contractor shall be responsible for all OSHA personal sampling.
- C. At completion of all asbestos removal work and prior to removing containment and engineering controls, the Consultant will conduct a final visual inspection of the work area. The area must be free and clear of any visible debris. At the option of the Consultant, the Consultant may obtain representative substrate samples to confirm complete removal of all asbestos. Substrates that may be sampled by the Consultant include, but are not limited to, floors from which mastics or caulking compounds were removed. The Consultant will analyze substrate samples by polarized light microscopy in accordance with EPA protocols. If trace amounts or greater of asbestos is detected in any one sample, or if visual debris is present, then the Consultant will not consider the asbestos removal work complete. The Contractor shall be required to re-clean the designated work site and then the Consultant will repeat the final inspection prior to conducting clearance air testing.
- D. Final clearance air samples will be collected inside the contained removal work area after the visual inspection has determined that the area is free and clear of any suspect material.
 1. Air shall be agitated by means of a leaf blower prior to the test, and kept agitated by means of a electric fan. The results of all samples must be less than 0.010 fibers per cubic centimeter (f/cc) for PCM analysis or less than an average of 70 structures per square millimeter for Transmission Electron Microscopy (TEM) to be in compliance with clearance criteria as described in this specification, Massachusetts DLS regulations, or AHERA regulations. The

first set of final clearance air tests for each removal area will be paid by the Owner. In the event that these air tests do not pass the clearance criteria, any subsequent air tests that need to be performed shall be paid for by the Contractor. If the Contractor fails to meet the criterion, the Contractor shall be required to re-clean the designated work site and then the Consultant will repeat the final air clearance testing. Cleaning and testing shall be repeated until the specified criterion is met.

3.9 WORK REVIEW

- A. The Consultant will review Contractor's work practices prior to the start of and periodically during asbestos related work and will report any noted violations of the requirements of this specification to the Contractor. If the Contractor fails to correct deficiencies in a timely manner, the Owner will be notified in writing, and work may be stopped. The Consultant will review the containment structure and negative air conditions before work begins and after the Contractor Site Supervisor has given approval. Outside containment airborne fiber concentrations must not exceed 0.010 fibers/cc or pre-abatement levels, whichever is greater. If concentrations exceed this level, then work must be stopped, conditions reviewed as to the probable cause, and then corrected.

PART 4 – PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 02084

HAZARDOUS MATERIALS ABATEMENT AND RELATED WORK

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. This Section specifies all labor, materials, tools and equipment necessary for the transportation and disposal of oil and hazardous materials (OHM) described in this section and located as indicated within interior portions included in the renovation project of the Riverside MBTA Carhouse located in Newton, Massachusetts.
- B. For the purpose of this specification, the following definitions apply:
 - 1. "Site" shall refer to the buildings identified as Riverside Carhouse located at 325 Grove Street in Newton, MA.
 - 2. "Owner" shall refer to MBTA.
 - 3. "Consultant" shall refer to Cardno ATC, who will act as the designated authorized representative of the Owner for the purpose of performing visual inspections, monitoring of the regulated work areas and conducting clearance air sampling.
 - 4. "Contractor" shall refer to the General Contractor's hazardous materials Subcontractor.
- C. The Contractor shall be responsible for the characterization, handling, transportation, and disposal/reuse/recycling of OHM, including, but not limited to, containerized materials, specified under this contract.
- C. The Contractor is responsible, subject to review by the Owner and Consultant for the complete characterization of the OHM in accordance with disposal facility requirements and all applicable laws and regulations and for the disposal of the materials in a safe and legal manner. Disposal facility shall be selected by Contractor and subject to Owner and/or Consultant's approval.
- D. The Contractor is encouraged to recycle/reuse materials where appropriate in lieu of disposal if the material is of acceptable physical quality and chemical quality, and the Contractor can identify a facility willing and permitted to accept the material in accordance with all applicable laws and regulations. The Contractor shall select the most cost-effective recycling facility, subject to Owner and/or Consultant's approval. The facility must have all applicable permits in good standing to accept materials for recycling.
- E. The Contractor shall conduct all work in accordance with a Health and Safety Plan (HASP) developed by the Contractor in accordance with Occupational Safety and Health Administration (OSHA) regulations and any other applicable federal, state, or local regulations.
- F. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 02084 – HAZARDOUS MATERIALS ABATEMENT AND RELATED WORK.
2. Section 02090 – LEAD-CONTAINING PAINT CONSIDERATIONS.

1.2 SUMMARY OF WORK

A. Work covered by this Section consists of furnishing all labor, equipment, materials and services to remove and dispose of potential OHM, with the exception of asbestos-containing material and lead-containing paint encountered. The following areas are scheduled for renovation, and are covered by this section:

- Six (6) interior areas of the first floor of the Riverside Carhouse, which includes platforms, bathrooms and hydraulic pressure control unit (HPCU) room, and the Basement Corridor.

B. Inspections of the Site by Cardno ATC on August 9, 2013 (Riverside) revealed the following OHM (see Appendix A – HAZARDOUS MATERIALS SURVEY: RIVERSIDE CARHOUSE – GENERAL):

- Fluorescent and high-intensity discharge (HID) light ballasts;
- Fluorescent light bulbs; and
- Motors and pumps.

OHM items that are located within interior portions of the Site buildings that will be disturbed as part of the renovation project work to be performed under this specification are summarized in the Hazardous Building Materials Inventory Table, attached to this Specification. The identified OHM does not include asbestos-containing materials, lead-based paint, or plumbing/vent systems.

Cardno ATC assumed that any mobile items currently in-use (i.e. computer equipment, scanners, televisions, cleaning and maintenance supplies, etc.) in occupied areas will be removed before the start of work; therefore, these materials were not included in the survey.

Additional materials may be present in areas inaccessible during the inspection, or that were moved into, out of, or within the Site buildings since the time of the inspection. It shall be the Contractor's responsibility to identify all OHM (except asbestos and lead-based paint) to their satisfaction in the Site buildings for purposes of determining project costs, prior to submittal of a bid.

1.3 DEFINITIONS

A. Oil or Hazardous Materials (OHM)

1. Material defined as OHM in accordance with 310 CMR 40.0000 and 310 CMR 30.00.

B. RCRA/State-Regulated Hazardous Waste

1. OHM defined as a RCRA characteristic or listed hazardous waste in accordance with 40 CFR 261; and/or
2. OHM defined as a hazardous waste in accordance with 310 CMR 30.00 and/or 310 CMR 30.100 et seq.

C. TSCA Regulated Waste

1. OHM which exceeds the TSCA criteria for polychlorinated biphenyls (PCBs) as defined in 40 CFR 761 Subpart D.

D. RCRA/TSCA Regulated Waste

1. OHM which meets the requirements as both a RCRA hazardous waste and a TSCA regulated waste as defined above.

E. Non-Hazardous Special Waste

1. Materials containing OHM not otherwise categorized.

1.4 QUALITY ASSURANCE

A. General: The Contractor shall conform to all applicable requirements, ordinances, codes, regulations, policies and/or laws, including but not limited to those of:

1. The Massachusetts Department of Environmental Protection (MassDEP).
2. The Massachusetts General Laws (MGL).
3. The U.S. Environmental Protection Agency (USEPA).
4. The Occupational Safety and Health Administration (OSHA) with special emphasis on 1926.65/1910.120 Hazardous Waste Operations and Emergency Response.
5. Local Fire Department regulations.
6. Local Health Department regulations.
7. The U.S. Department of Transportation (USDOT).

B. Manifests/Bills of Lading

1. A Uniform Hazardous Waste Manifest, bill of lading, or other applicable documentation is required for the removal from the premises of all items included in this Section by Contractor, and disposal by Contractor. The Contractor shall obtain and prepare all such documents.
2. Each manifest, bill of lading, as well as all other documentation required herein, shall be clearly and distinctly marked with the contract number and removal and disposal order number as applicable.
3. Each manifest, bill of lading, or other applicable documentation, shall note the truck registration number, state of registration, name of driver, and date of removal of material from the Site.

4. The cost of preparation and processing of the manifests, bills of lading, and other applicable documents shall be included in the bid amount.

C. Inspection:

1. All services of Contractor shall be subject to inspection by the Owner or its authorized representatives. The Owner shall have the right, but not the duty, to inspect and obtain copies of all written licenses, training records, permits, and approvals issued by any entity or agency to the Contractor or its subcontractors which are applicable to the performance of services under this contract; to inspect and test, at its own expense, transportation vehicles or vessels, containers, and disposal facilities provided by the Contractor; and to inspect the handling, loading, transportation, storage and disposal operations conducted by the Contractor in the performance of this contract.
2. The Owner and/or Consultant must pre-approve and shall have the right to inspect and obtain duplicates of all samples collected by the Contractor. If requested by the Owner or the Consultant, the Contractor shall collect and supply these samples to the Consultant for analyses by a laboratory selected by the Owner and/or Consultant.
3. The Owner and its representative shall be afforded free access to any facility used by the Contractor in performing services under this contract.
4. The Contractor is solely and exclusively responsible for the quality of all services performed under this contract. The Owner's right to conduct inspections at Contractor's facilities does not relieve the Contractor of this responsibility. Neither the Owner's, nor their authorized representatives', failure to make such inspection, nor failure to discover nonconforming services, will impose any liability on the Owner or their authorized representatives, nor shall it prejudice the rights of the Owner thereafter to reject services, and shall not relieve the Contractor of its obligation to perform work strictly in accordance with the contract and applicable local, state and federal regulations.
5. The Contractor, in its agreement with subcontractors, shall ensure that the inspection rights described herein are afforded to the Owner by each subcontractor performing services under this contract.

If any of the services do not conform to contract requirements, the Owner will require the Contractor to perform the services again at no additional cost to the Owner. When the defects in services cannot be corrected by re-performance, the Owner may (1) require the Contractor to take necessary action to ensure that future performance conforms to contract requirements, and (2) reduce the contract price to reflect the reduced value of the services performed.

1.5 SUBMITTALS

The Contractor shall provide the following submittals:

- A. The Contractor shall be responsible for obtaining any necessary licenses and permits and for complying with any applicable federal, state and local laws, codes, policies and regulations in connection with the performance of this work. The Contractor shall provide a copy of all such permits and licenses to the Consultant at least five (5) business days prior to the start of work. Applicable permits pertaining to recycling or disposal facilities to be utilized shall also be provided at this time.
- B. The name, address, and qualifications of the Environmental Laboratory which they intend to use for this project. The laboratory shall be certified, as applicable, by the Commonwealth of Massachusetts to perform the required analyses.
- C. If sampling is requested and approved by Owner, the Contractor shall submit to the Consultant all analytical results including chain of custody records within seven (7) business days of receipt and at a minimum five (5) business days prior to off-site transportation and recycling or disposal of the items included in this Section. The Contractor shall submit to the Consultant summary tables of all analytical results and identify how the material shall be classified for recycling or disposal.
- D. Submit to the Consultant, for its or Owner review, approval, and signature, completed copies of all waste profiles, applications and questionnaires, seven (7) business days prior to forwarding them to the party requiring these documents.
- E. Submit to the Consultant for approval a Work Plan including all pertinent information relating to the removal and transportation of OHM from the Site, within 20 business days after issuance of the Notice to Proceed and at least five (5) business days prior to the start of Work. The Work Plan, at a minimum, shall include:
1. The name(s), address(es), and contact information of Subcontractors retained for Work of this Section.
 2. A detailed description of Work activities and progress schedule for each phase of the Work associated with the removal, transportation, and recycling or disposal of OHM.
 3. A statement of compliance and evidence of said compliance, with applicable federal, state, regional, and local regulations covering such work.
 4. Name(s), address(es), and contact(s) of hazardous materials transporter(s) that the Contractor plans to use to transport OHM from the Site to a recycling or TSD facility, including EPA identification number (where applicable) and proof of permit, license, or authorization to transport OHM in all affected states.
 5. Name(s), address(es), and contact(s) of recycling or TSD facility(s) that the Contractor plans to use to accept OHM from the Site, including nature of storage/disposal of OHM, and documentation that the facility(s) will accept the designated materials from the Site.
 6. Certificate of Insurance in a form and identifying coverages satisfactory to Owner.

7. Letter(s) of acceptance from each recycling or TSD facility with the OHM it will accept from the Site, including, but not limited to, those items identified in Paragraph 1.2B.
- F. The Contractor shall complete any manifests, bills of lading or other documents required to transport and recycling or dispose of the items identified in this Section. The Contractor shall submit the completed forms to the Consultant for Owner review and signature. The Contractor shall provide the Owner and the Consultant with a copy of the manifest(s), bills of lading, and any other shipping documents at least five (5) business days prior to transport of the material from the Site.
- G. Completed copies of all manifests, bills of lading and other applicable documents and certified scale weight receipts or certified liquid quantity measurements, as applicable, must be furnished to the Owner as attachments to all invoices. The Contractor shall also be responsible for processing and distributing, as necessary, the completed manifests, bills of lading or other applicable documentation, as required by local, state and federal regulations.
- H. The Contractor shall prepare and submit, to the Owner, a report that summarizes and documents the removal and recycling or disposal of all OHM which left the Site. The report shall be a prerequisite for payment. At a minimum the report shall include the name of each recycling or disposal facility, a summary of materials disposed of at each facility, and a copy of the manifest, bill of lading, and/or other applicable documentation for each load.

1.6 WASTE AUDIT

- A. An inspection was conducted by Cardno ATC on August 9, 2013 (Riverside), and August 13, 2013 (Lake Street and Reservoir), to identify OHM at the Site. The results of this inspection indicated various materials at the Site which need to be removed and disposed of as part of this contract. The summary table listing the observed materials is attached to this specification.
- B. The Contractor is responsible for determining if such information is valuable in completing the work. The Contractor is responsible for field verifying the presence or absence of the materials outlined in the attached summary table prior to bidding on this project. However, any sampling by Contractor must be pre-approved in writing by Owner. No basis for claim shall result from the Contractor's failure to completely identify and/or characterize OHM/hazardous waste.
- C. The Contractor shall be responsible for all labor and costs associated with OHM characterization, sampling and analysis.

1.7 REGULATORY REQUIREMENTS

- A. The Work of this Section shall be performed by the Contractor in accordance with all applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and recycling or disposal of materials managed under this contract.

B. The Contractor shall obtain all federal, state and local permits required for the removal, handling, transport and recycling or disposal of materials managed under this contract. The Contractor shall adhere to all permit requirements.

1. The Contractor shall document that the recycling or disposal facilities proposed have all certifications and permits as required by federal, state and local regulatory agencies to receive and dispose of the material managed under this contract.

C. The following regulations are cited for the information and guidance of the Contractor. The list below is not all-inclusive; the Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, transportation, and recycling or disposal of the OHM found at the Site.

State: Code of Massachusetts Regulations (CMR)

1. Hazardous Waste Regulations, 310 CMR 30.000 – MassDEP
2. Requirements Governing Waste Oil and Used Oil Fuel, 310 CMR 30.250 – MassDEP
3. Universal Waste Management Standards, 310 CMR 30.1000 – MassDEP
4. Solid Waste Management Facility Regulations, 310 CMR 19.000 – MassDEP
5. Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16.00 – MassDEP
6. Rubbish Handling Regulations, 527 CMR 34.00 – Massachusetts Board of Fire Prevention
7. Transportation of Flammable and Combustible Liquids, 527 CMR 8.00 – Board of Fire Prevention
8. Dust, Odor, Construction, and Demolition Standards, 310 CMR 7.09 – MassDEP
9. Noise Standards, 310 CMR 7.10 – MassDEP
10. Waste Disposal Ban Regulation, 310 CMR 19.017 – MassDEP
11. Clean Air and Water Act, 310 CMR 1-8 – MassDEP
12. Massachusetts Contingency Plan (MCP) 310 CMR 40.0000 – MassDEP

Federal: Code of Federal Regulations (CFR)

1. Hazardous Waste Management Regulations, 40 CFR 260-268 – USEPA
2. Universal Waste Management Standards, 40 CFR 273 – USEPA
3. Standards for the Management of Specific Hazardous Wastes, 40 CFR 266, USEPA
4. Occupational Safety and Health Standards, 29 CFR 1910 – OSHA
5. Safety and Health Regulations for Construction, 29 CFR 1926
6. PCBs Manufacturing, Processing, Distribution in Commerce, and Use Prohibition, 40 CFR 761 – USEPA
7. Hazardous Materials Regulations Relating to Transportation, 49 CFR 171-180 – USDOT
8. Recycling and Emissions Reduction of Refrigerants, 40 CFR 82 - Subpart F – USEPA
9. Management of Used Oil Standards, 40 CFR 279 – USEPA
10. Toxic Substances and Control Act (TSCA) – 40 CFR 761 – PCBs Manufacturing, Processing, Distribution in Commerce, and Use Prohibition

CONFORMED

PART 2 – PRODUCTS

2.1 GENERAL

- A. The Contractor shall provide all personnel with personal protective equipment (PPE), protective clothing, and monitoring equipment consistent with the levels of protection required for each type of work. The Contractor is responsible for determining the required level of PPE for any work associated with this contract.
- B. The Contractor shall provide granular absorbent such as Speedy-Dry or approved equal, and any other emergency spill response equipment as may be necessary to complete the work outlined in this Specification.
- C. The Contractor shall provide all drums, overpack drums, storage containers, recovery cylinders, packing materials, and related products and materials required for collecting, storing, and transporting OHM in compliance with MassDEP, USEPA, and USDOT requirements. All drums shall meet the requirements of USDOT 49 CFR 173.
- D. The Contractor shall provide all monitoring devices, equipment, and containers necessary to collect, sample, drain, evacuate, flush, handle, secure, remove, transport, and recycle or dispose of all OHM at the Site.
- E. The Contractor shall provide all materials, products, and equipment necessary to bulk, shred, sort, flush, dilute, or otherwise prepare OHM for recycling or disposal at approved facilities.
- F. The Contractor shall provide all materials for temporary containment areas including but not limited to berms, containment pads, impervious barriers, and absorbent materials.

PART 3 – EXECUTION

3.1 GENERAL

- A. The Contractor shall prepare a summary of analytical data (parameters must be pre-approved in writing by Owner prior to sampling) as part of the document package. The applicable transportation and recycling or disposal documents shall be prepared by the Contractor and submitted to Owner and Consultant at least five (5) business days prior to planned shipment of the materials. The Contractor should note that the applicable documents may be subject to applicable local, state and federal agency review and approval. The Consultant or designated representative shall review all manifests, bills of lading, and other applicable documentation on behalf of the Owner. **The Owner will be the generator and will sign all manifests, bills of lading, and other applicable documentation as required.**
- B. Utilization of a hazardous waste manifest shall require the use of a licensed hazardous material transporter in conformance with the Massachusetts Hazardous Material Regulations as required by 310 CMR 30.000. A Licensed Site Professional (LSP) Opinion

(MCP-310 CMR 40.0000) is not required when using a hazardous waste manifest when transporting contaminated materials. The Contractor's Licensed Site Professional is responsible for stamping and signing all Massachusetts Bills of Lading, if any.

- C. All Work shall be performed in a manner as to prevent any spills and leaks.
- D. In the event that Work is being conducted in the vicinity of floor drains or openings in the floor, berms or other barriers shall be constructed to prevent the release of OHM to the sanitary sewer system, stormwater system, or subsurface at the Site.
- E. The Contractor shall ensure that all required permits are obtained and in place including those required of any subcontractor, prepare all manifests and certifications, and deliver all copies of completed manifests and final certifications and certification of recycling or destruction to the Consultant in the form of one complete disposal document.

3.2 CHARACTERIZATION OF WASTES

- A. The Contractor shall be responsible for all labor and costs associated with waste characterization, sampling and analysis, where necessary for particular waste streams.
- B. The Contractor is responsible to ensure that materials are characterized to meet recycling or disposal facility requirements.
- C. If requested by the Owner or the Consultant, the Contractor shall, at the time of sample collection, provide duplicate samples for analysis by a laboratory selected by the Owner.
- D. In the event that there are discrepancies between the Contractor's and Owner's laboratory, the Contractor shall have their laboratory check and verify their results and provide all laboratory analytical backup.
- E. If the Contractor and the Owner cannot agree on the correct laboratory analytical results, the Contractor shall collect and resubmit samples to its laboratory for analysis at no additional cost to the Owner.
- F. Sampling of material shall be done by the Contractor at sufficient and adequately distributed locations and for necessary parameters pre-approved by Owner so that the concentrations of the chemical constituents are adequately characterized.

3.3 MATERIAL-SPECIFIC PROCEDURES

A. BALLAST REMOVAL

- 1. All interior light fixtures shall be removed by Contractor using appropriate techniques and personal protection gear as detailed in the submittals.
- 2. Prior to removal of any ballasts, the Contractor shall uncover and inspect the label on the ballasts. All ballasts designated as "No PCBs" shall be marked with green paint. All other ballasts and capacitors, unless it can be proven that they were manufactured after 1998, shall be assumed to contain PCBs and shall be marked with red paint. Similar color-coding shall be used for the receiving drums.

3. Removal shall be performed using approved methods and tools that will minimize damage to the fluorescent lamp and ensure a quick, neat removal with the ballast or capacitor intact and undamaged.
4. Once removed, the ballasts and capacitors shall be placed in red or green color-coded 55-gallon drums.
5. Once filled, the 55-gallon drums shall be closed and properly labeled for transport and disposal.

B. FLUORESCENT AND HIGH INTENSITY DISCHARGE (HID) BULB REMOVAL

1. All fluorescent and HID light bulbs shall be removed by Contractor using appropriate techniques and personal protection gear as detailed in the submittals.
2. Removal shall be performed using approved methods and tools that will minimize damage to the fluorescent and HID lamps and leave the bulbs intact and undamaged.
3. Contractor shall remove all fluorescent light bulbs and/or HID lamps, intact, prior to demolition activities, and dispose of all light bulbs as mercury or lead waste in accordance with all applicable state and federal regulations.
4. Once removed, the fluorescent and HID light bulbs shall be placed in appropriate containers for transport to a disposal facility.
5. Once filled, the appropriate containers shall be closed and properly labeled for transport and disposal.

C. MACHINERY FLUIDS

1. Contractor shall drain and collect liquids from all equipment containing lubricating oils, fuels, grease, hydraulic oils, or other types of fluids. This equipment includes, but is not limited to, motors, compressors, oil guns and systems, pumps and emergency generators and associated storage tanks.
2. Once removed, the machinery fluids shall be placed by Contractor in appropriate containers for transport to a disposal facility.
3. Once filled, the appropriate containers shall be closed and properly labeled by Contractor for transport and disposal.
4. Contractor shall decontaminate all systems as necessary by means of steam cleaning, triple rinsing with a cleaning fluid, or both, to remove all residual contamination. Contractor shall collect and drum all decontamination fluids into approved containers. Contractor shall label containers for transport and disposal.
5. Contractor shall label decontamination drum/container for transport and disposal.

3.4 STORAGE OF MATERIALS

- A. Once removed, materials shall be stored on-Site for no more than 30 calendar days. At the conclusion of each day's work, drums or other containers containing OHM shall be stored in a designated secure location until they are removed for transport and recycling or disposal.

3.5 WASTE PROFILES AND MANIFESTS/BILLS OF LADING

- A. The EPA RCRA ID No. for the Site will be provided to the Contractor by the Owner prior to the start of project activities.
- B. The Contractor shall be responsible for preparing and submitting to the Consultant for review all recycling or waste profile applications and questionnaires, and coordination with recycling or disposal facilities and all federal and state Environmental Agencies, as applicable. The Contractor shall provide the Consultant with completed copies of all waste profile applications and questionnaires for review at least five (5) business days prior to transportation off-Site. The Contractor shall not transport any material off-Site until the submitted paperwork is authorized by the Owner.
- C. The Contractor shall be responsible for preparing all OHM manifests, bills of lading and any other applicable paperwork with all applicable analytical backup, notification, and control forms. The Contractor shall be responsible for coordination with the recycling or disposal facilities.
- D. The Contractor shall provide certified tare and gross weight slips or certified liquid volume measurements for each load received at the designated facility, which shall be attached to each completed manifest and/or bill of lading. The completed manifest and/or bill of lading, with supporting documentation, shall be submitted to the Owner or Consultant.
- E. **The Owner will be designated as generator and will sign all manifests and waste profile applications or questionnaires.** The Contractor's Licensed Site Professional is responsible for stamping and signing all Massachusetts Bills of Lading, if any.
- F. The Contractor shall furnish all generator copies of the OHM manifests to the Owner. The Contractor shall submit copies to the applicable local, state and federal authorities, as required by regulations.
- G. The Contractor shall submit to the Owner and the Consultant, prior to receiving progress payment, documentation certifying that all materials were transported to, accepted, and disposed of, at the selected recycling or disposal facility. The Consultant or Owner's representative shall review all manifests, bills of lading, and other applicable documentation on behalf of the Owner. The documentation shall include, at a minimum, the following:
 - 1. Documentation shall be provided for each load from the Site to the disposal facility, including all manifests and any other transfer documentation as applicable.

2. Certified tare and gross weight slips and/or certified liquid quantity measurements for each load, as applicable.

3.6 TRANSPORT OF CONTAMINATED MATERIAL

- A. The Contractor shall not be permitted to transport contaminated materials off-Site until all disposal or recycling facility documentation has been received, reviewed, and accepted by the Owner.
- B. The Contractor shall transport contaminated materials from the Site to the disposal or recycling facility in accordance with all USDOT, USEPA, OSHA, RCRA, TSCA, and MassDEP regulations and any other applicable regulations.
- C. The Transporter(s) shall be licensed in all states affected by transport.
- D. The Contractor shall coordinate the schedule for truck arrivals and departures at the Site to meet the approved schedule.
- E. The Contractor shall not deliver waste to any facility other than the disposal facility(ies) listed on the shipping manifest, bills of lading, and/or other applicable approved documentation.
- F. The Contractor shall be responsible for inspecting the access routes for road conditions, overhead clearance, and weight restrictions, and shall provide traffic control when needed.
- G. The Contractor shall provide to the Consultant copies of all weight slips (both tare and gross) and certified liquid quantity measurements, for every load disposed of at the accepted disposal facility. The Owner shall only make progress payments upon receipt of this documentation.

3.7 OFF-SITE DISPOSAL OR RECYCLING

- A. The Contractor shall be responsible for the recycling or disposal of contaminated materials at licensed disposal/recycling facilities in accordance with all federal, state and local regulations, laws, codes, policies or requirements.
- B. The Contractor shall be responsible for acceptance of the specific material at an approved treatment, disposal, or recovery facility, for ensuring that the facility is properly permitted to accept the stated material, and that the facility provides the stated treatment and/or disposal services.
- C. All hazardous wastes, as defined, shall be disposed of at a RCRA or RCRA/TSCA permitted facility as appropriate.
- D. The Owner reserves the right to contact and visit the recycling or disposal facilities and regulatory agencies to verify their agreement to accept the stated material and to verify any other information provided. This does not in any way relieve the Contractor of any responsibilities under this contract.

- E. In the event that the identified and approved facility(ies) ceases to accept the stated materials or the facility(ies) ceases operations, it is the Contractor's responsibility to locate an alternate approved and permitted facility(ies) for accepting materials. No additional compensation shall be provided to the Contractor for having to utilize alternative facilities. The Contractor is responsible for making the necessary arrangements to utilize alternative facility(ies), and the alternate facility(ies) must be approved by the Owner in the same manner and with the same requirements as for the original facility(ies). Facilities shall be subject to approval by Owner and/or Consultant.
- F. All materials collected under this contract must be segregated and kept physically separate from any other items until the recycling or disposal facility is reached. The items must be so marked, so that they are readily identified as part of this contract throughout this period. In addition, the Contractor must ensure that there is a clear audit trail for all items until final treatment/disposal is accomplished.
- G. The Contractor shall coordinate the disposal of work-generated waste materials which may be contaminated. These waste materials include, but are not limited to, decontamination rinse water, disposable PPE, and miscellaneous disposable support equipment. Disposal of Contractor-generated waste shall be done at no additional cost to the Owner.
- H. Mere acceptance of a waste at a properly permitted treatment, storage, or disposal facility (TSDF) does not meet the definition of final treatment/disposal under this contract. It is the Contractor's responsibility to obtain all necessary documentation to prove that the final treatment/disposal of all items has been accomplished. This documentation shall be attached to the certificate of disposal and submitted with, or prior to, the payment requests.
- I. Treatment of waste on the Owner's premises is not permitted. Treatment is defined as any process that meets the definition of treatment as set forth in applicable federal (including 40 CFR 260.10), state and local laws, codes, policies and regulations.

3.8 SPILL RESPONSIBILITY

- A. The Contractor is solely responsible for any and all spills or leaks during the performance of work under this contract, which occur as a result of or are contributed to by the actions of its agents, employees or subcontractors. The Contractor agrees to clean up such spills or leaks promptly to the satisfaction of the Owner or its representative, and in a manner that complies with applicable federal, state and local laws, codes, policies and regulations. The spill cleanup shall be at no cost to the Owner or its representatives.
- B. As required, the Contractor shall notify all applicable local, state and federal authorities immediately if the transport vehicle is involved in an accident and a reportable quantity of OHM is released or suspected to have been released.
- C. The Contractor shall report all such spills or leaks, regardless of their quantity, to the Owner immediately upon discovery. A written follow-up report shall be submitted to the Owner as soon as possible, but not later than 24 hours after the incident. The written report shall be in narrative form and, at a minimum, include the following:
 - 1. Description of item spilled (including identity, quantity, manifest number, etc.).

2. Exact time and location of spill, including a description of the area involved.
3. Containment procedures initiated.
4. Description of cleanup procedures employed or to be employed at the Site, including location of disposal of spill residues, and corrective measures to prevent recurrences.

3.9 DECONTAMINATION PROCEDURES

- A. General: The Contractor shall furnish labor, materials, tools, and equipment for decontamination of all personnel, equipment and supplies that enter the contaminated work area or are exposed to contaminated material. The Contractor shall provide equipment, decontamination pads, etc. necessary for the decontamination of equipment and personnel.
- B. Methods: The decontamination procedure shall follow the requirements of 29 CFR 1926.65/1910.120 as described in the Contractor's Health and Safety Plan.
- C. Equipment:
 1. All equipment shall be provided to the work Site by Contractor free of contamination. The Owner and/or Consultant retain express authority to prohibit from the Site any equipment that in their opinion has not been thoroughly decontaminated prior to arriving at the project location. Any decontamination of the Contractor's equipment prior to arrival at the Site shall be at the expense of the Contractor. The Contractor is prohibited from decontaminating equipment on the project Site that is not thoroughly decontaminated upon arrival.
 2. The Contractor shall decontaminate all equipment that comes in contact with contaminated material, either directly or indirectly, after completion of work at one location and prior to beginning work at another location, as necessary or if so directed by the Owner or the Consultant.
- D. Rinse water used for decontamination which contains chemicals used during decontamination or which contains hazardous chemicals from the equipment which was decontaminated shall be collected, characterized, handled and disposed of, by the Contractor, at no additional cost to the Owner. Decontamination wastewater shall be classified as a "remedial wastewater."
- E. Payment for the removal and disposal/discharge of decontamination wastewater shall be included under the Contractor's base bid and shall not be paid for separately under any unit price item.
- F. The Contractor is responsible for any sampling and characterization as required by local, state, federal or facility requirements. All sampling must be pre-approved by Owner.
- G. The Contractor shall be responsible for all costs such as penalties and fines related to materials transported and/or disposed of in a manner not consistent with governing laws and regulations.

PART 4 – PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

**Hazardous Building Materials Inventory Table
MBTA Carhouses
Riverside – Newton, MA**

Building / Area	Hazardous Materials				
	4-foot long (or less) fluorescent bulbs	8-foot long fluorescent bulbs	Fluorescent/HID light fixture ballasts (labeled as "No PCBs")	Fluorescent/HID light fixture ballasts (Unlabeled)	Motors / Pumps (lubricating oil)
Riverside Carhouse					
Platform Type A (Rails 8-9)	28	-	14	-	-
Bathrooms	12	-	7	-	-
HPCU Room	28	12	14	6	5
Mezzanine (Above HPCU Room)	16	-	8	-	1
Basement Corridor		18	9		
Estimated Total Units	84	30	52	6	6

Note:

Quantities listed are based upon the August 2013 site inspections.

END OF SECTION

SECTION 02090
LEAD-CONTAINING PAINT CONSIDERATIONS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the Contract including General Conditions, Modifications to the General Conditions, and all Sections within Division 1-General Requirements that are hereby made a part of this Section.
- B. In addition to the requirements specified herein, refer to all Contract Documents for complete description of work required to be performed under this Section.
- C. Examine all Drawings and all other Sections of the Specifications for requirements of related sections affecting the work of this Section. A lead determination at the site indicates that various building components are considered to be coated with lead containing paint. General Contractor shall assume for all three carhouses that all interior and exterior building components including, but not limited to, wood, metal, concrete, plaster, CMU and gypsum board included in the project scope of work are coated with lead containing paint.
- D. The work of this Section shall be performed as stated herein. In performing the work of this section, the General Contractor shall refer to other Sections for additional procedures. The General Contractor is responsible for the coordination of the work of this Section with related work. No delays in completion of the work shall be claimed for lack of coordination.
- E. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds
- F. The General Contractor shall comply with all applicable federal, state, and local guidelines and regulations regarding all work involving the presence of lead-containing paint.
- G. The work of this Section references work of the Demolition Section. Additionally, requirements of the General Contractor regarding coordination and related work are identified in this Section and shall be considered the responsibility of the General Contractor.
- H. Use of roads at the site and all access to the site shall be as required by the Owner, and where described else ware in the Specification.
- I. For the purpose of this Section, the following definitions apply:

"Site" shall refer to the buildings identified as Riverside Carhouse located at 325 Grove Street in Newton, MA.

"Owner" shall refer to MBTA.

"Architect" shall refer to Baker / Wohl Architects.

"Consultant" shall refer to Cardno ATC, who will act as designated authorized representatives of the Owner for the purpose of inspecting, monitoring, and testing.

1.2 DESCRIPTION OF WORK

- A. The work of this Section specifies minimum requirements for the disturbance, removal, containment, and disposal of lead-containing paint and associated waste generated as a result of demolition activities as outlined in the Specifications.
- B. The procedures described herein apply to all construction/demolition work where a worker may be occupationally exposed to lead as well as to the disposal of the demolition debris. The General Contractor shall assume that any painted surface not tested, as included in this Section, shall be assumed to contain lead paint and it shall be the General Contractor's responsibility to protect workers performing under this Contract. This may require additional testing by the General Contractor to verify lead content.
- C. The General Contractor shall assume full responsibility and liability for the compliance with all applicable federal, state and local regulations pertaining to work practices, hauling and disposal of hazardous waste, hauling and recycling of all metal components coated with lead-containing paint, protection of workers and visitors to the site, and persons occupying areas adjacent to the site. The General Contractor shall hold the Owner, Architect, and Consultant harmless for failure to comply with any applicable work, hauling, disposal, safety, health or regulation on the part of himself, his workers or his subcontractors.
- D. The General Contractor is required to ensure the protection of workers performing any related renovation/demolition work that will affect surfaces coated with lead-containing paint as well as protecting the public and the environment from exposure to lead dust.
- E. Codes and Standards
 - 1. All work shall conform to the standards set by applicable federal, state and local laws, regulations, ordinances, and guidelines in such form in which they exist at the time of the work on the contract and as may be required by subsequent regulations.
 - 2. In addition to any detailed requirements of the Specification, the General Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of federal, state, regional and local authorities regarding handling and storing of lead waste material.
 - 3. The following references are cited as applicable standard and regulations as amended:
 - a. Code of Federal Regulations (CFR) Publications:
 - 29 CFR 1910 – General Industry
 - 29 CFR 1926.55 – Gases, Vapors, Fumes, Dusts and Mists
 - 29 CFR 1926.57 – Ventilation

- 29 CFR 1926.62 – Lead in Construction
- 29 CFR 1926.200 – Signs, Signals and Barricades
- 29 CFR 1926.354 – Welding, Cutting and Heating in Way of Preservative Coatings
- 29 CFR Subpart T – Demolition
- 40 CFR 50 – National Primary and Secondary Ambient Air Quality Standards for Lead
- 40 CFR 61 Subpart A – General Provisions
- 40 CFR 61.152 – Standard for Waste Manufacturing, Demolition, Renovation, Spraying, and Fabricating Operations.
- 40 CFR 241 – Guidelines for the Land Disposal of Solid Wastes
- 40 CFR 257 – Criteria for Classification of Solid Waste
- 40 CFR 261 and 262 – Waste Disposal Facilities and Practices

b. Massachusetts Regulations:

- 454 CMR 22.11 – Safety Procedures for renovation
- 454 CMR 23.00 – Occupational Lead Exposure

4. All regulations by the above and other governing agencies in their most current version are applicable throughout this project. Where there is a conflict between this Specification and the cited federal, state, or local regulations, the more restrictive or stringent requirements shall prevail.
5. THIS SECTION REFERS TO MANY REQUIREMENTS FOUND IN THESE REFERENCES, BUT IN NO WAY IS IT INTENDED TO CITE OR REITERATE ALL PROVISIONS THEREIN OR ELSEWHERE. IT IS THE GENERAL ONTRACTOR'S RESPONSIBILITY TO KNOW, UNDERSTAND, AND ABIDE BY ALL SUCH REGULATIONS AND COMMON PRACTICES.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. The work of this Section shall be performed as stated herein. In performing the work of this Section, the General Contractor shall refer to other Divisions for additional procedures. The General Contractor is responsible for the coordination of the work of this Section with other related work.

- B. Portions of the work herein require direct coordination with the work of the above noted Related Sections.

1.4 DEFINITIONS

- A. The following definitions apply to the performance of the work of this project.

1. Action Level: An airborne concentration of lead above 30-micrograms/cubic meter (μm^3) as a time-weighted average (TWA) for more than 30 days per year.
2. Area Monitoring: Sampling of lead concentrations within the work area and outside the work area, which is representative of the airborne concentrations of lead.
3. Clean Room: An uncontaminated change room directly adjacent to the work area having facilities for storage of employees' personal clothing and uncontaminated work clothes, materials and equipment provided when the airborne exposure to lead is above the PEL.
4. Architect: Authorized representatives who are under contract with the Owner to perform Engineering or Consulting services.
5. General Contractor: The term General Contractor refers to the General Contractor and its Sub General Contractors.
6. Decontamination Area: A contained area adjacent to or connected to the work area and consisting of an equipment room, shower area, and clean room which is used for decontamination of workers, materials and equipment.
7. HEPA Filter Equipment: High efficiency particulate air (HEPA) filtered vacuuming or exhaust ventilation equipment with a UL 586 filter system. Filters shall be of 99.97 percent efficiency for retaining 0.3-micrometer diameter particles.
8. Lead Containing Paint: Paint, varnish, or stain that contains lead in excess of 0.0 mg/cm² or 0.0% lead by weight.
9. Lead Permissible Exposure Limit (PEL): 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of air, based upon an 8-hour time weighted average.
10. Sample Location: Area or place where an air sample is collected.
11. Time Weighted Average (TWA): The TWA is an 8-hour time weighted average for the test of the concentration of lead for worker exposure.
12. Wet Cleaning: The process of removing lead contamination from building surfaces, equipment and other objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as lead contaminated wastes.
13. Work Area: A controlled-access work area which has plastic sheeting or other containment barriers erected to separate the trades.

1.5 SUBMITTALS

A. Notifications

1. Provide in proper and timely fashion, all necessary notifications to relevant Federal, State, and local authorities and obtain and comply with provisions of all permits or applications required by the work specified, as well as make all required submittals required under those auspices. General Contractor shall indemnify Owner, Architect and Consultant from, and pay for all claims resulting from failure to adhere to these provisions. Costs for all permits, applications, and the like are to be assumed by General Contractor.

B. Prior to commencing any work under this Section, the Contractor shall submit the following items to the Architect for review in accordance with Section 01320 - Submittals. No Work under this Section may commence until the Architect has accepted all required submittals.

1. Copies of all notifications, permits, applications, licenses and like documents required by federal, state, or local regulations and this specification obtained or submitted in proper fashion,
2. Copies of written medical opinions for each employee who may be occupationally exposed to lead as required by 29 CFR 1926.62 (j)(3)(v),
3. Employer's Lead Compliance Program as required by 29 CFR 1926.62, including proposed worker training, respiratory protection program and medical monitoring for all employees throughout all phases of the job, including make, model and NIOSH approval numbers of respirators to be used; worker orientation plan; written description of all proposed procedures, methods, or equipment to be utilized, including those that may differ from the Contract Specifications. In all instances, the General Contractor must comply with all applicable federal, state and local regulations.
4. Proposed number and type (i.e., hazardous waste or non-hazardous waste, open top, front loading, etc.) of dumpsters for waste, proposed location(s),
5. A list of all equipment to be used on site, by make and model,
6. Chain of Command of responsibility at work site including supervisors and competent person, their names, resumes and phone numbers,
7. List of total number of supervisors and workers intended to be assigned to the project, including name and lead awareness qualifications,
8. Material Safety Data Sheets on potentially hazardous materials to be used on the project,
9. Waste Disposal Plan which describes the waste stream and the disposal means (i.e. landfill, recycle, etc.) and includes the name, address, and ID number of the proposed hazardous waste hauler, waste transfer route, and proposed disposal reclamation or treatment facility,
10. Name and address of the proposed construction debris site,

11. Name and address of the proposed metal component construction debris recycling site, including letter stating such site accepts such waste,
 12. Construction schedule including sequence of critical work.
- C. Submit the following to the Owner/Architect as a Post-Construction submittal package:
1. Copies of waste manifests and receipts acknowledging disposal and recycling of all lead waste material from the project, showing delivery date, quantity, and appropriate signature of landfill's authorized representative.
 2. A notarized copy of the daily list of workers and site entry-exit logbook,
 3. All personnel monitoring results,
 4. All TCLP testing results.

1.6 GENERAL WORK PROCEDURES

- A. Work shall be carried out in sequential phases. Inspection and approval of each phase by the Architect shall be sought and gained before proceeding to the next phase and in accordance with the schedule agreed upon by Owner and General Contractor at the Pre-Construction meeting as amended. This shall include demolition requirements for work area clearance and work area release prior to general construction work. As a Contract requirement, any reasonable delay caused by this requirement will not constitute a basis for claim against the Owner/Architect. General Contractor must coordinate the work of this section with the work of the General Contractor and all other trades.
- B. At no time will Owner permit storage of debris generated from renovation/demolition activities to be stored inside buildings at the site, and any storage of materials shall be subject to Owner's approval. Assure security of debris at all times.
- C. The working hours for this project will be determined in the Pre-Construction meeting.

1.7 SPECIAL CONSIDERATIONS

- A. Testing References
1. Limited testing for lead paint has been performed on a representative number of painted surfaces and components in the four buildings scheduled for demolition using XRF sampling.
 2. General Contractor is to assume that all painted surfaces and components are lead-containing.
 3. The Occupational Safety and Health Administration (OSHA) requires employers to determine the airborne concentration of lead in dust in order to determine the employee's exposure hazard while impacting these coated surfaces and requires that the General Contractors and their employees adhere to the OSHA Lead-in-Construction standard found at 29 CFR 1926.62.

- B. The General Contractor shall follow the requirements of this Section regarding component removal, demolition, worker exposure and protection, work area cleaning, and waste disposal.
- C. Work Affected: In general, the following activities are minimum requirements of this Section and affect the demolition performed on the painted components:
1. No torch cutting, mechanical sanding or stripping or abrasive methods of paint removal shall occur.
 2. No demolition or renovation activities shall occur which increase the workers' exposure above the Action Level of $30 \mu\text{g}/\text{m}^3$. General Contractor shall fully comply with the OSHA lead standard at 29 CFR 1926.62.
 3. Workers shall be informed of the components to be impacted during renovation or demolition that have been identified as containing lead.
 4. Worker protection, at a minimum, shall comply with the OSHA Lead Standard 29 CFR 1926.62. Worker Right to Know and Health and Safety Standards of 1926.62 shall also apply to the work of this section.
 5. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same vicinity as work involving components identified with lead.
 6. Clean-up Activities: The General Contractor shall maintain work zones free of accumulated debris and paint chips of demolition involving lead.

1.8 REPORT OF FINDINGS

- A. The table below identifies various components identified as containing lead in excess of $0.0 \text{ mg}/\text{cm}^2$ for Riverside Carhouse located at 325 Grove Street in Newton, MA. The table was derived from a lead paint determination at the Subject Site. This inspection included the testing of representative painted surfaces in the above-mentioned building and is not intended to be a comprehensive identification of all painted surfaces.
- B. The Occupational Safety and Health Administration (OSHA) requires employers to determine the airborne concentration of lead in dust in order to determine the employee's exposure hazard while impacting these coated surfaces and requires that the General Contractors and their employees adhere to the OSHA Lead-in-Construction standard found at 29 CFR 1926.62.

Summary of XRF Lead Paint Sampling MBTA Riverside Carhouse

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
First Floor				
Platform 2 & 3:				
	Under Floor Horizontal Rail	Metal	White	>9.9
	Rail	Metal	Dark Red	9.0
	Support Column	Metal	Black	7.7
	Floor Edge	Metal	White	0.0
	Floor	Concrete	Yellow	2.8
Platform 6 & 7:				
	Under Floor Horizontal Rail	Metal	White	5.0
	Support Column	Metal	White	4.8
	Floor Edge	Metal	White	0.7
	Floor	Concrete	Yellow	0.4
Platform 8:				
	Stair Tread	Concrete	Yellow	-0.1
	Stair Riser	Concrete	White	-0.1
	Upper Horizontal Rail	Metal	White	-0.1
	Lower Horizontal Rail	Metal	White	2.2
	Round Support Column	Metal	White	0.4
	Side Wall	Concrete	White	-0.2
	Side Track	Metal	White	0.7
	Large Support Column	Metal	White	5.6
Platform 9: (Under Floor Level)				
	Upper Horizontal Rail	Metal	White	0.0
	Lower Horizontal Rail	Metal	White	8.8
	Support Column	Metal	White	3.9
	Small Stairs	Wood	Yellow	0.8

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
Platform 9: (Floor Level)				
	Stripe	Concrete	Yellow	0.2
	Floor Edge	Concrete	White	0.2
Platform 9: (Upper Platform)				
	Stairs	Wood	Yellow	0.4
	Hand Rail	Metal	Orange	-0.0
HPCU Room:				
	Double Door	Metal	White	-0.0
	Double Door Frame	Metal	White	-0.0
	Floor	Concrete	Gray	-0.2
	Support Pole	Metal	White	0.2
	Door	Metal	White	-0.0
	Door Frame	Metal	White	0.2
	Ceiling	Gypsum	White	-0.0
Men's Bathroom:				
	Interior Wall	Ceramic Tile	White	1.2
	Wall	Ceramic Tile	Tan	0.0
	Sink	Metal	White	0.7
	Door	Metal	Gray	-0.2
	Door Frame	Metal	Gray	0.0
	Exterior Wall	Cinder Block	White	-0.0
	Vertical Beam	Metal	White	2.6
	Wall	Concrete	Tan	-0.2
Basement				
Corridor:				
	Wall	Concrete	White	-0.1
	Wall	Cinder Block	White	0.0

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
	Ceiling Frame	Metal	White	-0.2
	Double Door	Metal	Gray	-0.2
	Double Door Frame	Metal	Gray	-0.0
	Double Door	Metal	Blue	-0.1
	Double Door Frame	Metal	Blue	-0.0
	Elevator Door	Metal	Blue	-0.2
	Elevator Door Frame	Metal	Blue	-0.2
	Lower Wall	Concrete	Blue	0.3
	Stairs to Egress Door	Metal	Blue	1.6
	Stair Railing	Metal	Light Green	1.9
	Egress Door	Metal	Green	0.5
	Egress Door Frame	Metal	Green	0.3
	Ceiling Air Vent	Metal	Gray	-0.0
Stairs – 1st Floor to Mezzanine				
	Wall	Cinderblock	Gray	0.0
	Horizontal Beam	Metal	Gray	1.8
	Vertical Beam	Metal	Gray	6.6
	Door	Metal	Gray	-0.0
	Door Frame	Metal	Gray	-0.1
Mezzanine				
Hallway:				
	Wall	Cinderblock	Yellow	-0.1
	Wall	Cinderblock	White	-0.0
	Door	Metal	Gray	-0.0
	Door Frame	Metal	Gray	0.0
Bathroom:				

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
	Door	Metal	Brown	0.0
	Door Frame	Metal	Brown	0.0
	Wall	Cinderblock	White	-0.1
	Pipe	Metal	White	-0.2
Men's Locker Room:				
	Wall	Ceramic Tile	Tan	-0.2
	Partition	Metal	Tan	-0.0
	Door	Metal	Brown	-0.2
	Door Frame	Metal	Brown	0.6
Freight Elevator Room:				
	Elevator Door	Metal	Gray	-0.1
	Elevator Door Frame	Metal	Gray	-0.1
	Wall	Cinderblock	White	-0.1
	Wall	Plaster	White	0.5
	Closet Door	Metal	White	-0.1
	Closet Door Frame	Metal	White	-0.1
	Double Door Frame	Metal	White	-0.1
Mezzanine Above HPCU Room				
Stairs 1 st Floor to Mezzanine:				
	Stair Wall	Gypsum	White	0.0
	Stair Cap	Wood	White	-0.2
	Stair Handrail	Wood	Stain	-0.0
Mezzanine Hallway:				
	Wall	Gypsum	White	0.0
	Door	Metal	White	-0.1
	Door Frame	Metal	White	-0.0

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
	Interior Window Frame	Wood	White	-0.0
Break Room:				
	Wall	Gypsum	White	-0.0
	Ceiling	Gypsum	White	-0.0
	Door	Metal	White	-0.1
	Door Frame	Metal	White	-0.1
Office:				
	Wall	Gypsum	White	0.0
	Ceiling	Gypsum	White	0.0
	Door	Metal	White	-0.1
	Door Frame	Metal	White	0.0

1.9 FEES, PERMITS & LICENSES

- A. The General Contractor shall pay all licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or process in the performance of the work specified in this section. The General Contractor shall be solely responsible for costs, damages, or losses resulting from any infringement of these patent rights or copyrights. The General Contractor shall hold the Owner/Architect from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights. If the Specification requests the use of any product, design, invention, or process that requires a licensing, patent or royalty fee for use in the performance of the job, the General Contractor shall be responsible for the fee or royalty fee and shall disclose the existence of such rights.
- B. The General Contractor shall be responsible for costs for all licensing requirements, where applicable and notification requirements, and all other fees related to the General Contractor's ability to perform the work in this Section.
- C. Secure all necessary permits for work under this Section, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work.

1.10 CLEAN-UP

- A. Maintain the work site in a neat and orderly manner at all times, so as not to interrupt or infringe upon the work of other trades.
- B. Comply with all requirements for release of work areas as described in the project specification.

- C. It is the prerogative of the Owner/Architect to inspect whenever deemed necessary and the General Contractor is responsible for meeting and correcting any deficiencies discovered which do not meet the current applicable regulations and requirements of these specifications.

1.11 COORDINATION

- A. Extend full cooperation to Owner in all matters involving the use of Owner's facilities. At no time shall General Contractor cause or allow to be caused conditions which may cause risk or hazard to the general public or conditions that might impair safe use of the facility. The use of the facility's electricity, water or like utilities by the General Contractor shall be as specified in Division 1.
- B. Coordinate the work of this section with that of all other trades. Phasing and scheduling of this project shall be subject to the approval of the Owner/Architect. The work of this Section shall be scheduled and performed so as not to impede the progress of the project as a whole. Work shall not proceed in any area without the express consent of the Architect.
- C. Unless specifically authorized by the Owner/Architect, the work of this project shall be conducted in accordance with the working hours agreed upon in the Pre-Construction Meeting.
- D. Inspections: The Architect may perform visual inspections during the work of this section, as described below. General Contractor shall not proceed with work until General Contractor has received the Owners/Architect's approval at the stages identified below:
 - 1. Post Inspection: At the completion of work and final clean up, prior to clearance or removal of any critical barriers and decontamination unit from the work area.
 - 2. Waste Removal Inspection: Prior to removal of hazardous waste from the site, Owner and Architect will inspect the quantity and type.

1.12 EMERGENCY PRECAUTIONS

- A. The General Contractor shall establish emergency and fire exits from the work area.
- B. When an injury occurs, the General Contractor shall stop work until the injured person has been removed from the work area.

1.13 DISPOSAL OF WASTE MATERIAL

- A. General
 - 1. The General Contractor shall comply with the Resource Conservation and Recovery ACT (RCRA) and with all applicable state and local regulations.
 - 2. The General Contractor shall be responsible for disposing of all metallic waste and components determined to be coated with Lead-Based paint (LBP) by separating and recycling.
 - 3. The General Contractor shall be responsible for disposing of all non-metallic waste

determined by Toxicity Characteristic Leachate Procedure (TCLP) to be hazardous. The General Contractor shall be responsible for testing representative building components prior to demolition of building structures and selective waste streams post demolition work.

4. The General Contractor shall comply with all EPA regulations.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The General Contractor shall deliver all materials and equipment to the site in the original containers bearing the name of the manufacturer, and details for proper storage and use.
- B. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner that shall not interfere with other trades working in the area.
- C. Unloading and temporary storage sites, and transfer routes, must be approved in advance by the owner.
- D. Damaged or deteriorated materials may not be used and must be promptly removed from the premises. Material that becomes contaminated shall be packaged and legally disposed in an approved, secure landfill.

2.2 MATERIALS

All materials and equipment proposed to be used on this project shall be subject to the acceptance of the Owner/Architect. The required materials shall include, but not necessarily limited to the following:

- A. Fire retardant polyethylene sheeting, minimum thickness of six (6)-mil.
- B. Plastic bags, minimum thickness of six (6)-mil.
- C. Duct Tape, up to 3 inch width
- D. Lead Warning Signs, as required by Section 3.02, the MA DOS Regulations, and OSHA Hazard Communication requirements.
- E. Flexible duct for ventilation units (if required)
- F. Spray adhesive, fire retardant
- G. Personal Protective Equipment, NIOSH approved respirators
- H. Ventilation units with HEPA filtration and exhaust fans.
- I. HEPA vacuums

J. Tri-sodium Phosphate (TSP) and product data

K. Cloth tarpaulin

2.3 TOOLS AND EQUIPMENT

A. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transporting, and unloading waste without exposure to persons or property. All over-the-road transportation equipment must carry the appropriate hazardous waste transport licenses and insurance.

B. Vacuum Equipment: All vacuum equipment utilized in the work area shall utilize HEPA filtration systems.

C. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for water application.

D. Other Tools and Equipment: The General Contractor shall provide other suitable tools including but not limited to: rounded edge shovels, rakes, brooms, and carts.

E. The General Contractor shall provide ground fault circuit interrupters (GFCI) to protect all electrical cord and connections.

F. Approved lighting equipment for use in the work area.

G. Scaffolding: Scaffolding, as required to accomplish specified work, shall meet all applicable federal, state and local safety regulations and used in accordance with manufacturer's specifications.

PART 3 – EXECUTION

3.1 SCHEDULING

A. The General Contractor shall coordinate all scheduling with the Owner/Architect. A schedule of work shall be submitted to the Owner/Architect, prior to contract performance.

3.2 UTILITIES

A. Provide all necessary connections for temporary utilities in the workplace during work. Shut down and disconnect all electrical power to the work area so that there is no possibility of reactivation and electrical shock during the work. The temporary electrical power shall be in accordance with all OSHA requirements.

3.3 IDENTIFICATION OF HAZARDS

- A. Prior to any work involving lead-containing items, the General Contractor shall identify all work activities in which a worker may be occupationally exposed to lead.
- B. The General Contractor shall initially determine if any worker may be exposed to lead above the action level.

3.4 BARRIERS AND ISOLATION AREAS

- A. Containment controls (including critical barriers, protective coverings, HEPA-filtered ventilation and decontamination facilities) may be required for demolition work. The degree of containment shall be appropriate for the anticipated levels of airborne lead dust. The lower the level of airborne lead, the lesser the requirements necessary to control lead emissions at the job site.
- B. Work Area Isolation (unless exempted according to Paragraph A)
 - 1. The General Contractor shall isolate work areas for the duration of work by completely sealing off all openings in the work area. Isolation sealing shall be accomplished by constructing critical barriers where necessary around the work area perimeter. The work area shall be sealed airtight to the greatest extent possible.
 - 2. Provide temporary power and lighting (with ground fault circuit interrupt protection) to the work areas, and ensure safe Installation of temporary power sources and equipment per applicable electrical code requirements, and OSHA requirements for temporary lighting in the environment normal to renovation/demolition areas.
- C. Equipment and Services: The General Contractor shall provide portable lighting, staging and scaffolding, utility hook-ups, portable fire extinguishers, first aid equipment, and all other equipment or items for the safe and efficient performance of Work.
- D. Decontamination Facility:
 - 1. The General Contractor shall erect one or more Decontamination Facilities (if applicable) to serve each work area. The facility will consist of series of two or more connected chambers including, at a minimum, a clean room and a shower/wash room, separated by an air lock. Unless otherwise specified, the shower/wash room shall be contiguous to the work area. Non-contiguous, remote, three-chamber decontamination facilities may be substituted with the Architect's prior written approval. Three-chamber decontamination facilities shall include an equipment room to be used for removal and temporary storage of contaminated worker clothing, equipment, and other items leaving the work area, prior to decontamination in the shower/wash room of the decontamination facility.
 - 2. In all cases, non-emergency access between contaminated and uncontaminated rooms or areas shall only be through the Decontamination Facility/Wash Room.
 - 3. Ensure that barriers and linings are effectively sealed and taped at all times, and that the Shower/Wash Room floor is completely watertight. Repair damaged barriers, and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning of each work period.

- E. All lead in renovation/demolition work areas shall remain isolated from all other trades on the project and remain inaccessible to the public. General Contractor shall monitor the access to the renovation/demolition work areas. The below listed items are required to control the generation of lead-containing dust during renovation/demolition activities if worker exposure is above the PEL. The General Contractor is ultimately responsible for cleaning all generated dust and paint debris from renovation/demolition operations and must maintain work areas free from lead dust generated from renovation/demolition activities.

1. Signs shall be posted at all approaches to the work area warning that work involving lead is being conducted in the vicinity. Signs shall be in bold lettering not smaller than two inches tall.
2. Barriers shall not be removed until the work areas are thoroughly cleaned and approved by the Architect.

3.5 APPROVALS AND INSPECTIONS

- A. All temporary facilities, work procedures, equipment, materials, services, and agreements must strictly adhere to and meet this Section along with EPA, OSHA, regulations and recommendations as well as federal, state, and local regulations. Where there exists overlap of these regulations, the most stringent one applies. All work performed by the General Contractor is further subject to approval of the Owner/Architect.

3.6 PERSONNEL SAMPLING – GENERAL CONTRACTOR

- A. Perform personnel air sampling during all renovation/demolition work to determine worker exposure limits. The results of such sampling shall be posted, provided to individual workers, and submitted to Owner/Architect as described herein.
- B. Provide sampling to check personal exposure levels. Representative sampling shall be taken for the duration of the work shift or for eight hours, whichever is less. Personal samples need not be taken for repeated working conditions if working conditions remain unchanged, but must be taken every time there is a change in the removal operation, either in terms of the location or the type of work. Sampling will be used to determine eight-hour Time-Weighted-Averages (TWA). Personal sampling shall be as outlined in OSHA Standard 29 CFR 1926.62.
- C. Air sampling results shall be transmitted to the Owner/Architect and individual workers available at the job site in written form no more than forty-eight (48) hours after the completion of a sampling cycle. The reporting document shall list each sample's result, sampling time and date, personnel monitored and their social security numbers, flow rate, sample duration, sample yield, cassette size, and analyst's name and company, and shall include an interpretation of the results. Air sample analysis results will be reported in micrograms/cubic meter ($\mu\text{g}/\text{m}^3$).
- D. The General Contractor's testing lab shall be AIHA accredited for analysis of metals. General Contractor shall submit for Owner's/Architect's review and acceptance the name and address of the laboratory, certification(s) of AIHA accreditation for metal analysis, listing of relevant experience in air lead analysis, and presentation of a documented Quality Assurance and Quality Control program.
- E. Air monitoring frequency will be established in accordance with the requirements set forth in 29 CFR

1926.62.

3.7 WORK PROCEDURES

- A. The General Contractor shall initiate, and continue, sufficient engineering and work practice controls, as described in the General Contractor's Lead Compliance Program, to reduce and maintain worker exposures to lead at or below the Action Level.
- B. The following work practices are specifically required by these specifications:
 - 1. All persons except those directly involved in the work shall be excluded from the work area. Physical barriers shall be used, where necessary, to limit access to the work area for the duration of the window renovation activities. (Warning signs may need to be posted in accordance with applicable regulations.)
 - 2. Provide hand washing facilities and assure that all workers thoroughly wash their hands and face upon exiting the work area. Workers shall pay careful attention to cleanse the hands and face when decontaminating (Provide hygiene facilities, including shower, as required based on initial assessment and continued monitoring.)
 - 3. Thoroughly wet the areas to be demolished and mist the air to reduce the potential for creating airborne lead and dust.
 - 4. All equipment used by the workers inside the work area shall be either left in the work area or thoroughly decontaminated before being removed from the area. Extra work clothing (in addition to the disposable suits supplied by the General Contractor) shall be left in the clean area until the completion of work in that area. The clean area shall be cleaned of all visible debris and disposable materials daily.
 - 5. Under no circumstances shall workers or supervisory personnel eat, drink, smoke, chew gum, or chew tobacco in the work area; to do so shall be grounds for the Architect to stop all demolition operations. Only in the case of life threatening emergency shall workers or supervisory personnel be allowed to remove their protective respirators, if applicable, while in the work area.

3.8 RENOVATION/DEMOLITION PROCEDURES

- A. Feasible engineering controls shall be implemented by the General Contractor as described in the Lead Compliance Program to minimize the possibility of contamination of areas adjacent to the work area. The following activities are the minimum requirements of this section and affect the renovation/demolition performed on the painted components:
 - 1. No torch cutting, mechanical sanding or stripping or abrasive methods of paint removal shall occur.
 - 2. No renovation/demolition activities may occur which increase the workers exposure above the Action Level of $30 \mu\text{g}/\text{m}^3$. General Contractor shall fully comply with the OSHA lead standard 29 CFR 1926.62.

- B. Workers shall be informed of the components to be impacted during renovation/demolition that are identified as containing lead.
- C. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same areas as demolition involving components identified as containing lead. Other trades may not enter these areas until clean-up procedures are completed.

3.9 STORAGE OF WASTE

- A. Use of waste and recycling containers on site shall be controlled under the following requirements:
 - 1. Location of waste and recycling containers on site shall be coordinated with the General Contractor, subject to Owner's/Architect's approval.
 - 2. Waste containers shall be lined with two layers of six-mil polyethylene sheeting, be solid, enclosed containers, locked and sealed at all times. This requirement applies to waste classified as hazardous based on TCLP testing.
 - 3. General Contractor shall comply with all federal, state, and local regulations and ordinances regarding lead waste and recyclable storage.

PART 4 – PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 02221
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 1. Requirements of this Section apply to all building systems, including fire protection, plumbing, mechanical, and electrical installations.

1.2 DEFINITIONS

- A. "Cutting and Patching" refers to temporary or limited removal of parts and subsequent repair (where repair is required by finish condition) of assemblies that are otherwise indicated to remain in place, to permit other indicated construction work to proceed.
- B. Permanent removal and/or replacement of selected portions of the building for alterations are included in Section 02223 – SELECTIVE DEMOLITION.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required in "Quality Assurance" article, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Engineer's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio. Structure elements include but are not limited to the following:
1. Foundation construction.
 2. Bearing and retaining walls.
 3. Structural concrete.
 4. Structural steel.
 5. Lintels.
 6. Timber and primary wood framing.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
1. Primary operational systems and equipment.
 2. Air or smoke barriers.
 3. Fire-suppression systems.
 4. Mechanical systems piping and ducts.
 5. Control systems.
 6. Communication systems.
 7. Conveying systems.
 8. Electrical wiring systems.
 9. Life safety systems (fire alarm systems and emergency lighting).
 10. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Exterior curtain-wall construction.
 4. Equipment supports.
 5. Piping, ductwork, vessels, and equipment.
 6. Stair systems.
 7. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Comply with requirements of Fire Department and other authorities having jurisdiction for safety precautions during cutting and patching of life safety systems.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
- B. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and masonry: Cut using a cutting machine, such as a carborundum saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 02223

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section requires the selective removal and subsequent offsite disposal of various interior and exterior nonstructural components, as required to accommodate new construction.

1.2 ENUMERATION OF DEMOLITION WORK

- A. Without limiting the generality thereof, selective demolition work includes the following.
- B. Do not demolish active systems or equipment that serve an area outside of the work area; remove only those portions that serve work area.
- C. In case of question about extent of demolition required in any area or system, seek direction from Architect prior to beginning work.
- D. General Demolition: As work of the General Contractor, selective demolition includes:
 - 1. Site clearing, including the following:
 - a. Concrete paving.
 - 2. Asbestos abatement, as enumerated in and in accordance with Section 02080 – ASBESTOS ABATEMENT AND RELATED WORK.
 - 3. Other hazardous materials, as enumerated in and in accordance with Section 02084 – HAZARDOUS MATERIALS ABATEMENT AND RELATED WORK.
 - 4. Handling materials with lead-containing paint, as enumerated in and in accordance with Section 02090 – LEAD-CONTAINING PAINT CONSIDERATIONS.
 - 5. Removal of brackets, hangers, supports and other attachment hardware, where the supported item is or has been removed.
 - 6. Limited saw-cutting and partial removal of concrete slabs to permit indicated underslab work.
 - 7. As work of Section 02221 – CUTTING AND PATCHING
 - a. Limited removal of existing roofing to accommodate new work.
 - b. Selective removal of structural decking.
 - 8. Finishes, ceilings, substrates, partitions and accessories in toilet rooms, where indicated.
- E. Plumbing: As work of Division 15 – MECHANICAL, selective demolition includes:
 - 1. Removal of plumbing piping, fixtures, equipment, fittings, and related items.
 - 2. Where domestic water and waste lines must remain in place to serve active fixtures outside of the work area, remove branch piping to greatest extent possible and cap remaining portions to permit continued service.
- F. Mechanical: As work of Division 15 – MECHANICAL, selective demolition includes:

1. Removal of ventilation equipment and controls serving the work area.
 2. Where ductwork or equipment must remain in place to serve active equipment outside of the work area, remove piping and equipment to greatest extent possible and cap remaining portions to permit continued service.
- G. Electrical: As work of Division 16 – ELECTRICAL, selective demolition includes:
1. Removal of electrical wiring, fixtures, lighting and equipment, and related items.
 - a. Provide temporary power and lighting services in the work area in accordance with Section 01500 – CONSTRUCTION TEMPORARY FACILITIES AND TEMPORARY CONTROLS.
 2. Removal of existing disused or abandoned electrical life safety equipment and devices in the work area, including fire alarm detectors, indicators, and manual stations; emergency lighting; and associated conduit, cabling, and accessories.
 - a. DO NOT remove life safety equipment from means of egress serving occupied portions of the building. Make temporary provisions if necessary.
 3. Temporary removal or relocation of electrical work to remain in service.
 4. Where electrical service must remain in place to serve active systems to remain, remove branch wiring and conduit to greatest extent possible and cap remaining portions to permit continued service.
 - a. Where panels or circuits serve areas inside and outside of the work area, remove only those components serving the work area.
 - b. Where circuit breakers are removed from panels to remain, install covers over open breaker boxes. Clearly label abandoned circuits.

1.3 DEFINITIONS

- A. "Selective Demolition" refers to the permanent removal of selected portions of the structure.
- B. Temporary or limited removal of parts of assemblies that are otherwise indicated to remain in place, to permit other indicated construction work to proceed, and subsequent repair (where repair is required by finish condition), is "Cutting and Patching" specified in Section 02221 – CUTTING AND PATCHING.

1.4 SUBMITTALS

- A. Submit a schedule indicating proposed sequence of operations for selective demolition work to MBTA Resident Engineer for review prior to start of work. Include coordination for extent of demolition with new construction, together with details for dust and noise control and protection of residents and property.
 1. Provide detailed sequence of demolition and removal work to ensure uninterrupted continuing occupancy of the building.
 2. Coordinate preparation of demolition plan with sequencing plans and construction schedules required by Division 1 sections.

- B. Photographs of existing conditions of adjacent finishes and improvements that might be misconstrued as damage related to selective demolition operations. File with MBTA Resident Engineer prior to start of work.
- C. Work samples demonstrating proposed demolition method and final result, for each multiple component.
- D. For the Handling of Underslab Excavated Soils:
 - 1. Proposed soils disposal facility.
 - 2. Laboratory analytical report.

1.5 QUALITY ASSURANCES

- A. Demolisher Qualifications: General demolition work shall be supervised by a licensed construction superintendent.
 - 1. Demolition work of specialty trades shall be supervised by persons possessing licenses to install the work being demolished.
 - 2. Coordinate extent of demolition with new requirements for new construction. Do not over- or under-demolish existing work. Coordinate extent of demolition required with all affected trades.
- B. Temporary Support of Work to Remain: Some fire protection, plumbing, mechanical and electrical work to remain, including active circuiting, fire alarm components, and piping, may be supported on partitions or other construction indicated to be demolished. As work of the respective sections, the affected subcontractors shall temporarily relocate work to remain, to permit continued service throughout the work area. Provide temporary support as required.
 - 1. Upon completion of permanent construction, re-secure work to remain to permanent substrates in accordance with contract documents.
- C. Means of Egress: Do not obstruct or impair required means of egress. At end of each work day, restore means of egress to proper working order.

1.6 PROJECT AND SITE CONDITIONS

- A. Coordinate extent of demolition with new requirements for new construction. Schedule demolition and removal work to minimize time between demolition and installation of new finishes.
 - 1. Demolition shall be closely coordinated with new construction activities and phased accordingly.
- B. Protection: Provide protections specified in other sections and as follows to protect occupants of occupied structures, public, and existing property from injury or damage due to selective demolition work.
 - 1. Provide protective measures as required to provide free and safe passage of occupants and public to occupied portions of building.
 - 2. Protect existing finish work that is to remain in place and becomes exposed during demolition operations from damage.

- C. Fire Alarm System Block-Out: Block out or bag fire detection devices in work areas before performing dust- or smoke-generating demolition work.
 - 1. Do not disable building fire alarm system.
 - 2. Obtain approval of Fire Department authorities having jurisdiction and pay any fees required.
 - 3. Restore impaired devices upon completion of work at day's end to provide fire detection coverage in the work area, unless otherwise approved in writing by fire officials.
 - 4. Provide fire watches and other safety precautions at no cost to Owner, where required to do so by authorities having jurisdiction.
- D. Damage: Promptly repair damage caused to adjacent facilities by demolition work.
- E. Traffic: Conduct debris removal operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- F. Flame Cutting: Do not use cutting torches for any removal work.
- G. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
 - 1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
 - 2. Do not damage plumbing risers or other building utilities during wall demolition; where damage is caused, immediately suspend demolition and effect repairs.
- H. Dust Controls: Use temporary enclosures and daily cleaning to limit dust and dirt migration.
- I. Signage: Do not remove directional signage until day of replacement with new signs.
- J. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- K. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed. Storage or sale of removed items on site will not be permitted.

PART 2 — PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

1. Cease operations and notify MBTA Resident Engineer immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
- B. Cover and protect furniture, equipment, and fixtures from soiling or damage when demolition work is performed in areas where such items have not been removed.
- C. Do not begin demolition work until all protections specified herein and in other sections have been installed and work of others has been completed.
- D. Concrete and Masonry Cutting: Where concrete or masonry cutting is indicated adjacent to occupied portions of the building, construct dust proof partitions.
- E. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
 1. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner of any shutdown of service necessary during changeover.
 2. The Owner will permit limited interruption of utility services to occupied areas of the building only if, in its opinion, temporary provision or an alternate construction method is infeasible.

3.2 DEMOLITION, GENERAL

- A. General: Removal all abandoned or disused mechanical and electrical equipment, piping and conduit, wiring, and devices, unless specifically indicated on drawings to remain.
- B. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations. Use tools and methods required to complete removal without damaging fixtures and finishes indicated to remain. Do not disturb existing finishes indicated to remain.
 1. Promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
 2. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
 3. Do not use power-driven impact tools for demolition, unless authorized by the Owner.
- C. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Architect in written, accurate detail. Pending receipt of directive from Architect, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.
- D. Remove fastened items by unfastening from substrates, using tools and equipment intended for the type of fastener. Do not damage underlying substrates.

3.3 DEMOLITION PROCEDURE

- A. Wall Covering and Adhered Finishes: Remove finishes using methods recommended by manufacturer. Use steamers if required to loosen adhesive.

1. Use scrapers to remove all adhesive residues and leave walls smooth, flat and in condition to receive specified new finish.
 2. Remove wall panels, whether adhesively attached or mechanically fastened, and attachment accessories. Leave walls smooth, flat and in condition to receive specified new finish.
- B. Ceilings: Remove acoustical panel ceilings and suspension systems in small sections; cut out and remove by controlled methods. Do not attempt to drop large areas of the ceiling at once.
- C. Flooring: Remove flooring, adhesives, mastics, underlayments, mortar setting beds, and other substances to structural slab or deck, using approved methods. Prepare surfaces to receive new specified finishes.
- D. Ceramic Tile: Unless otherwise indicated in drawings, remove tile finishes, mortar setting beds, metal lath, and accessories to structural substrate.
- E. Remove fasteners, hangers, and accessory items associated with demolished equipment.
- F. Masonry and Concrete Cutting and Coring:
1. General: Comply with requirements of Section 02221 – CUTTING AND PATCHING.
 2. Demolish concrete and masonry in small sections; do not use power-driven impact tools.
 - a. Create openings only as necessary to accommodate new work; do not over-demolish.
 - b. Core concrete using power-driven coring tools intended for that purpose.
 - c. Cut openings in concrete using concrete saws intended for that purpose.
 - d. Do not permit debris to fall into wall cavities; remove all demolished materials from area.
 - e. Protect adjacent spaces from air- or waterborne debris caused by cutting operations.
- G. Roofing, flashing, metal fabrications, blocking and miscellaneous roofing system materials:
1. Construct an enclosed chute from roof for removal of debris from roof area. Protect building surfaces at chute/set-up areas with tarpaulin. Secure tarpaulin.
 2. Dust Control: Thoroughly wet materials to be removed prior to disturbance as necessary to prevent dust from being dispersed into the air.
 3. Remove material to be disposed from roof as it accumulates. Clean up spilled or scattered debris immediately. Remove dumpster/chute from premises upon job completion.

3.4 HANDLING OF UNDERSLAB EXCAVATED SOIL FROM TRENCHES

- A. Existing Conditions Information:
1. Underslab soil in trenches excavated as part of the Project may be contaminated with oil and/or hazardous materials due to potential historical releases at the facility. Previously, some soil contamination at the Riverside site has been detected and regulated under MGL Chapter 21e, although not in the specific locations of the Work of this Project. All previous Reportable Conditions regulated under MGL Chapter 21e have been closed out with the Massachusetts Department of Environmental Protection.

B. Procedures for Evaluating and Managing Excavated Soils:

1. Evaluate by observation soils excavated during trenching work for signs of obvious contamination, such as odors, staining, or visible chemicals such as oil in the soil. If any indications of obvious soil contamination are observed, immediately stop work and notify the Authority.
2. Store all soils excavated from the trenches on-site, stockpiled on and covered with minimum 5-mil polyethylene sheeting. The cover sheeting over the soil shall extend beyond the edges of the stockpile and be weighted down to secure in place. The location of the soil stockpile shall be approved by the Authority, and shall not be within 50 feet of a stormwater catch basin, near a low-lying area depression or trough where stormwater may accumulate or flow, or near any other environmentally sensitive area.
3. If the excavated soils are not obviously contaminated per the evaluation noted above and none of the soil is to be disposed off-site, the soil may be re-used as backfill material in the trenches.
4. If all or a portion of the excavated soils are to be disposed off-site, propose a disposal facility for approval by the Authority. Collect a representative composite sample of the stockpiled soil, using appropriate field methods, for laboratory analysis of the parameters required by the approved disposal facility. Submit the name of the analytical laboratory and list of parameters to be analyzed to the Authority for approval prior to collection of the sample. Notify the Authority at least one business day before collecting the sample; a representative of the Authority may be present to observe the sampling process. Provide sample results (the laboratory analytical report) to the Authority within two business days of receipt from the laboratory, along with an evaluation and statement as to whether the results meet the receiving requirements of the approved disposal facility. The Authority must approve the shipment of the soil before the soil may be transported off-site. If a portion of the excavated soil is planned for re-use as backfill on-site, it may not be used for this purpose until and unless the sample results show that all analyzed compounds are below RCS-1 reportable concentrations as listed in the Massachusetts Contingency Plan (MCP).
5. Prepare all transport and disposal paperwork for review by the Authority, including waste profiles and manifests. An Authority representative will sign profiles and manifests as generator on behalf of the Authority. The Authority will provide a generator EPA ID number, if needed.
6. Manage, transport, and dispose all soil in accordance with all federal, state, and local requirements, including, but not limited to, the MCP (310 CMR 40.0000), the Massachusetts Hazardous Waste Regulations (310 CMR 30.000), and U.S. Department of Transportation regulations.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
 1. Comply with Division 1 sections for handling demolition debris in the building.
- B. Except where indicated in an individual section as the responsibility of a particular subtrade, disposal of demolished materials shall be the responsibility of the General Contractor.
- C. Do not permit the uncontrolled accumulation of demolition debris on site. All debris shall be collected and stored in secure containers, inaccessible to the public, on a daily basis.

3.6 PREPARATION FOR NEW FINISHES

- A. General: Where a surface is indicated to receive a finish specified in another section, review preparation requirements with that substrate. Leave surfaces ready for final surface preparation specified in sections.
- B. Vermin-proof substrates to remain by filling voids created in assemblies with mortar or other approved permanent fillers.

3.7 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
- B. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 02313

EARTHWORK (LIMITED APPLICATIONS)

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the following items.
 - 1. Preparing subgrades for slabs-on-grade, where existing slabs-on-grade are removed and replaced.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 03353 – CAST-IN-PLACE CONCRETE (LIMITED APPLICATIONS), for compaction and sub-base requirements for slabs.

1.2 DEFINITIONS

- A.** Excavation: Consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B.** Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, manholes, catch basins or other man-made stationary features constructed above or below the ground surface.
- C.** Subgrade: The uppermost surface of an excavation.

1.3 QUALITY ASSURANCE

- A.** Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
- B.** Design Criteria: Excavate to required elevations and dimensions within a tolerance of plus or minus 1 inch, except elevations at slabs on grade shall be plus or minus 1/4 inch.
- C.** The Authority reserves the right to perform inspections and testing at any time during the execution of work.
- D.** When rework or replacement of soils are required to achieve compaction, the Authority will conduct confirmatory testing.

1.4 QUALITY CONTROL

- A.** The Contractor shall assume full responsibility for control inspection and testing and give sufficient notice to the Engineer to permit the witnessing of the inspections or tests.
- B.** The contractor shall engage a qualified, independent testing agency to perform quality control testing and inspections. Comply with the following testing standards:
 - 1. ASTM D 2922: Test methods for density of soil and soil-aggregate in place by nuclear methods (shallow depth).

1.5 SUBMITTALS

- A.** Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

1.6 PROJECT CONDITIONS

- A.** Protection of Persons and Property: Barricade open excavations occurring as part of this work.
 - 1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B.** Site Information: Subsurface utility data shown on drawings is made available to the Contractor for information only. Drawings are not intended as representations or warranties of accuracy. It is the Contractor's responsibility to confirm locations of all utilities and subsurface structures prior to start of excavation.
- C.** Visit the site to review all details of the work and working conditions and to verify dimensions in the field including headroom and interferences from adjacent structures. Notify the Engineer in writing of any discrepancy before performing any work.
- D.** Existing Utilities: Locate existing underground utilities in areas of excavation work.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A.** Reuse excavated materials where possible. Supplement with materials indicated where excavated materials are unsuitable for structural base.
- B.** Granular Fill (Subbase and Base Material): Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940, free of clay, loam, roots, sod, rubbish, and other deleterious or organic material; graded within the following limits:

Passing Sieve Size	Percent Finer by Weight
1 inch	100%
1/2 inch	50-85%
No. 4	40-75%
No. 40	10-35%
No. 200	0-5%

PART 3 - EXECUTION

3.1 PREPARATION

- A.** Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B.** Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 EXCAVATION

- A.** Unclassified Excavation: Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
 - 1. Excavation includes excavation of obstructions, underground structures, utilities, and other items indicated to be demolished and removed.
 - 2. Excavation includes excavation of unsuitable soil materials and backfilling with acceptable bearing soil materials.
- B.** Protect all subgrade soils. Excavate disturbed subgrade and backfill in accordance with specifications at Contractor's expense.
- C.** Excavate soil and all other materials required to accommodate construction operations and utilities.
- D.** Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

3.3 STORAGE OF SOIL MATERIALS

- A.** Stockpile excavated materials acceptable for backfill and fill where directed.
- B.** Do not stockpile materials in a location that will interfere with building operation, pedestrian or vehicular traffic in public ways, or access to site.

1. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.4 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 1. Surveying locations of underground utilities for record documents.
 2. Testing, inspecting, and approval of underground utilities.
 3. Removal of trash and debris from excavation.
 4. Removal of temporary shoring and bracing, and sheeting.
- B. Fill over-excavated areas under structure bearing surfaces in accordance with specifications at Contractor's expense.
- C. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand operated tampers.
- D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
- E. Re-compact fills subjected to disturbances.
- F. Remove surplus materials from site.
 1. At completion of Work, leave fill material stockpile areas completely free of excess fill materials.

3.5 COMPACTION

- A. All percent compactions are referenced to the maximum dry density of the soil as determined in accordance with ASTM D1557, Method C.
- B. Structural Slabs:
 1. Excavated fill to base course subgrade, compacted to at least ninety-two percent (92%).
 2. Cover with granular fill base course, 6 inches thick, compacted to at least ninety-five percent (95%).

3.6 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

- B. Grading inside Building Lines: Finish subgrade to a tolerance of 1/4 inch when tested with a 10-foot straightedge.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: The Contractor shall engage a qualified independent testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer and of bearing surfaces. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. An Independent Laboratory will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained. Authority will conduct confirmatory testing.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the User Agency's property.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 03353

CAST-IN-PLACE CONCRETE (LIMITED APPLICATIONS)

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the following items.
 - 1. This Section specifies cast-in-place concrete for the following limited applications including formwork, reinforcing, mix design, placement procedures, and finishes:
 - a. Concrete slab infill at utility trench
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 02223 – SELECTIVE DEMOLITION, for demolition of existing concrete slabs.
 - 2. Section 02313 – EARTHWORK (LIMITED APPLICATIONS), for subgrades under slabs-on-grade.

1.2 DEFINITIONS

- A.** Cementitious Materials: Portland Cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 SUBMITTALS

- A.** Product Data: For each type of product indicated.
- B.** Design Mixtures: For concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
 - 2. Indicate amount of fly ash in the mix.
- C.** Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Steel reinforcement and accessories.
 - 4. Concrete Sealer

5. Bonding agents.

1.4 QUALITY CONTROL / QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment. Manufacturer shall be responsible for sampling and testing of concrete ingredients and establishing concrete mix proportions.
- B. **Testing and Inspection Services by the Authority:** Concrete plant inspection; and field control will be by the Authority at the expense of the Authority.

1. The Contractor agrees to accept as indicative, the results of tests, including test results involving mix designs and field quality control of concrete mixtures. If, as a result of these tests, it is determined that the specified concrete properties are not being obtained, the Engineer may order such changes in proportions or materials, or both, as may be necessary to achieve the specified properties, at no additional expense to the Authority.
2. The use of testing and inspection services shall in no way relieve the Contractor of his responsibility to furnish materials and construction in compliance with the Contract Documents.
3. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Engineer for final acceptance.

Additional testing and inspection services requested by the Contractor because of changes in materials, sources, or proportions, or occasioned by failure of tests and inspection to meet specification requirements, shall be paid for by the Contractor. The costs for such additional testing and inspection services will be established by the Engineer. Provide at no additional expense to the Authority all materials, labor, and services for sampling and testing required by the Engineer, including but not limited to:

- a. Transportation of sample materials from source to the Authority's Materials Testing Laboratory, 170 Freeport Street, Dorchester, Massachusetts.
 - b. Preparation, handling, storage and transportation of concrete test specimens as directed by the Engineer.
 - c. Suitable containers for the storage, curing and transportation of concrete test specimens in accordance with ASTM C 31.
 - d. Suitable storage for a supply of test cylinder molds, test equipment and other items required for sampling and testing.
- C. When additional sets of test cylinders beyond the mandatory seven and twenty eight day tests are required by the Contractor to verify early form removal or other reasons for his benefit, the Authority shall be reimbursed for the cost of fabricating and testing these additional test cylinders. The Contractor has the option of obtaining additional test services from an independent testing laboratory agency approved by the Engineer. Copies of test data from these additional tests shall be submitted to the Engineer for review and approval.

- D. The minimum number of test cylinders to be made for each class of concrete and for each placement will be four for each 100 cubic yards or less and minimum of four extra cylinders for each additional 50 cubic yards or fraction thereof. When additional sets of test cylinders are required beyond the normal seven and twenty-eight day tests, each set will consist of a minimum of two test cylinders.
- E. Independent Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.
- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- G. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code – Reinforcing Steel".
- H. Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete".
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
 - 3. ACI 318, "Building Code Requirements for Reinforced Concrete".
 - 4. ACI 308, "Standard Practice for Curing Concrete".
 - 5. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
- I. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: Shall be American-made Portland Cement, free from water soluble salts or alkalis that will cause efflorescence on exposed surfaces. Portland Cement shall be Type II, ASTM C 150. Use only one brand of cement for each type of cement throughout the project. Contractor shall be responsible for whatever steps are necessary to ensure that no visual variations in color will

result in exposed concrete and shall place on order and secure in advance a sufficient quantity of this (these) cement(s) to complete concrete work specified herein.

1. Fly Ash: ASTM C 618, Type F 15-35%
2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120, 25-50%

- B.** Normal Weight Fine Aggregates: Shall be washed, inert, natural sand conforming to ASTM C 33 and following additional requirements:

<u>Sieve</u>	<u>Percent Passing</u>
#4	95-100 (typical)
#16	50-85
#50	5-30
#100	0-10
Fineness Modulus	2.80 (+/- 0.20)
Organic	Plate 2 maximum
Silt	2.0 percent maximum
Mortar Strength	100 percent minimum compression ratio
Soundness	15 percent maximum loss, magnesium sulfate, five cycles

- C.** Normal Weight Course Aggregates: Shall be well graded crushed stone or washed gravel conforming to ASTM C 33 and the following additional requirements:

Designated Size (inches)	3	2	1-1/2	1	3/4	1/2	3/8
F.M. (+/- 0.20)	7.95	7.45	7.20	6.95	6.70	6.10	4.50
Organic	Plate 1 maximum						
Silt	1.0 percent maximum						
Soundness	5 percent maximum loss, magnesium sulfate, five cycles						

- D.** Maximum designated sizes for normal weight coarse aggregate to be used in concrete sections shall be as noted below, except that sizes shall also be chosen in conjunction with required clearances.

1. One and one-half inches for sections over ten inches in thickness.
2. One inch for sections more than eight and up to ten inches in thickness.
3. Three-quarter inch for sections more than three and up to eight inches in thickness.

- E.** Water: From approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material and complying with the requirements of ASTM C 94.

- F.** Admixtures:

1. Admixtures, General: Provide admixtures for concrete that contains no chloride ions.
2. Water-reducing agent: ASTM C 494, Type A.

- a. "WRDA" – W.R. Grace & Co.
 - b. "PDA25" – Protex Industries, Inc.
 - c. "Pozzolith 344H" – Master Builder's Co.
 - d. Or approved equivalent
 - e. Note: Water-reducing agent shall be by same manufacturer as air-entraining agent.
3. Air-entraining agent: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - a. "DAREX AEA" – W.R. Grace & Co
 - b. "PROTEX AEA" – Protex Industries
 - c. "MB-VR" or "MB-AE" – Master Builder's Co.
 - d. Or approved equivalent
 4. Superplasticizer: High-range water-reducer conforming to ASTM C 494, Type F or Type G.
 5. Corrosion Inhibitor Admixtures: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor, capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
 - a. Axim Concrete Technologies; Catexol 1000CI.
 - b. Boral Material Technologies, Inc.; Boral BCN2.
 - c. Cortec Corporation; MCI 2000 or 2005NS.
 - d. Grace Construction Products, W.R. Grace & Co.; DCI-S.
 - e. Master Builder's Inc.; Rheocrete 222+.
 - f. Sika Corporation; FerroGard-901.
 - g. Or approved equivalent.
 6. Admixtures retarding setting of cement in concrete shall not be used without written approval by the Engineer.
 7. Admixtures causing accelerated setting of cement in concrete shall not be used without written approval of Engineer.

2.2 CONCRETE MIXTURES

- A. Prepare design mixes for concrete by either laboratory trial batch or field experience methods as specified in ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete. The Contractor shall recommend, on the basis of trial mixes and strength curves specified below, design mixes for each type and strength of concrete. The Testing Agency will verify that the proposed mix designs conform to all specification requirements.
- B. Sufficient materials for concrete mix design shall be furnished by the Contractor not less than five weeks before use. Duplicate small samples plainly and neatly labeled with source, where proposed to be used, date, and name of collector shall be provided and presented to Testing Agency for permanent reference.
- C. Mixes shall be designed in accordance with “Method 1” of ACI 301, and the requirements of this Section. All concrete is normal weight unless specifically designated otherwise; air-dry weight not to exceed 150 lbs. per cubic foot.
- D. All structural concrete shall have a minimum 28 day compressive strength of 4,000 psi.
- E. Exterior concrete shall contain air-entraining admixture when tested to ASTM C 231 at the point of discharge from the truck mixer:

<u>Aggregate Size</u>	<u>Air Content, %</u>
1-1/2 in.	4.5 - 7.5
3/4 in.	5.0 - 8.0
3/8 in.	6.0 - 9.0

- F. Concrete shall have the following slump when tested to ASTM C 143 at the point of discharge from the truck mixer:

<u>Condition</u>	<u>Slump, inches</u>
With Water-Reducing Agent	4-1/2 - 7
With High-Range W/R Agent	7-9
Without Water-Reducing Agent	2 - 5

- G. Concrete slabs, including slabs on grade, shall have a mid-range water reducer and have a maximum slump of 6 inches.
- H. The approved superplasticizer shall be used in all concrete walls, including slabs on grade.
- I. Design mix of concrete to be used in work shall correspond to following test strengths (TABLE A) obtained in laboratory trial mixtures.

TABLE A

Minimum Strength of Lab Trial Mixes (psi)

Design Strength	Trial Mix Strength	
	7-days	28-days
4000	3400	5200
5000	4200	6200

- J. Any deviation from approved mix design, which Contractor deems desirable under certain project conditions, will not be allowed without written approval of Engineer. Cost of any additional testing by Testing Agency associated therewith shall be paid for by Contractor.

2.1 REINFORCEMENT AND ACCESSORIES

- A. Reinforcing Steel Bars: Shall be newly rolled billet steel conforming to ASTM A 615 Grade 60; ASTM A 775 epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length. Bars shall be bent cold.
- B. Welded Wire Fabric: Shall conform to ASTM A 185.
- C. Reinforcement Accessories: Shall conform to Product Standard PS7-766, National Bureau of Standards, Department of Commerce, Class C, as produced by Superior Concrete Accessories, Inc.; Dayton Sure-Grip Co.; or R.K.L. Building Specialties Co., Inc. Reinforcement accessories shall include spacers, chairs, ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening reinforcement. Tie wire shall be galvanized or stainless wire of sufficient strength for intended purpose, but not less than No. 18 gage. Metal supports shall be of such type as not to penetrate surface of formwork and show through surface of concrete. Accessories touching interior formed surfaces exposed to view shall have not less than 1/8 inch of plastic between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
- D. Fabrication: Fabricate reinforcement in accordance with ACI 315 to the lengths, sizes, and configurations shown on the drawings.

2.2 MISCELLANEOUS MATERIALS

- A. Non-Shrink Grout: Ready-to-use aggregate product requiring only addition of water at job site such as "Embeco Pre-mixed Grout" by Master Builder's; "Vibro-Foil Ready-Mixed" by W.R. Grace & Co.; or "Ferrolith G" by Sonneborn Building Products, Inc. Grout shall be easily workable and shall have no drying shrinkage at any age. Compressive strength of grout (2" x 2" cubes) shall not be less than 5000 psi at 7 days, and 7500 psi at 28 days.
- B. Epoxy Adhesive: 100% solids epoxy resin system to bond new concrete and reinforcing to old concrete, meeting the requirements of ASTM C 881-90, Types I, II, IV and V, Grade 2, Class "B" and "C".
- C. Vapor Barrier: 6 mil polyethylene, unless specifically specified elsewhere.
- D. Membrane Curing Compound: ASTM C 309, Type 1. Product used shall be shown to be compatible with the later application of coatings. Curing compound shall not be used on any floor slab scheduled to receive an adhered floor finish.
- E. Membrane Curing Compound for Architectural Concrete: Liquid membrane curing compound complying with AASHTO M148, Type 1D, except Type 2 if required to control temperature of mass concrete and hot weather concrete.

- F. Sheet Curing Materials: Waterproof paper (regular or white), polyethylene film (clear or opaque white), and white burlap-polyethylene sheet complying with AASHTO M171.
- G. Chemical Hardener: All exposed concrete floor slabs shall be hardened with three applications of fluosilicate chemical hardener followed by two applications of clear acrylic concrete sealer by Sonneborn Division, ChemRex Inc. "Lapidolith"; or equal products by W.R. Meadows Co. and Concrete Service Material Company or other manufacturers.
- H. Penetrating Sealer: Monomeric alkyalkoxy silane sealer which has demonstrated penetrability into dry low permeability concrete to a minimum of 1/4 inch. Sealer shall have 20 to 25 percent solids when used on walls, and 40 to 50 percent solids when used on floors.
- I. Epoxy Membrane Curing Compound/Concrete Sealer: The two component, epoxy resin system shall act as a dual purpose material: A membrane compound for curing alone, plus a penetrating sealer. It shall provide protection for concrete exposed to de-icing salts, commercial acids and alkalis, gasoline, diesel fuel, and oil, and exposure to freeze/thaw cycles and to vehicular traffic. The epoxy resin compound shall be furnished in two components for combining immediately prior to use in accordance with the manufacturer's written instructions as specified herein. The components of the epoxy resin system shall conform to the following requirements.
1. Component A: Poly (2 hydroxypropylene, P'p, isopropylidenephenolate) condensed with 1 chlorepropoxirane such that the ox content is 4% in aralkyl and hydroxylated solvents. Component B: The amido amine condensate of the Diels Alder adduct of polyunsaturated acids dissolved in suitable solvents. Ratio of components (A to B): 1:1 by volume.
 2. Properties of Mixed Material:
 - a. Viscosity: 75 to 125 cP's at 75°F.
 - b. Pot Life: 8 hours minimum at 75°F.
 - c. Minimum Solids Content: 40 to 44% by weight.
 - d. Recoat Time: 24 hours maximum.
 - e. Dry Film Thickness: 2 to 3 mils per coat.
 - f. Color: Clear, White tint, gray tint.
 3. Properties of Cured Material:
 - a. The cured system shall exhibit no evidence of a mine blushing or sweating which may inhibit bond of subsequent coats.
 - b. When tested according to ASTM D 968, specimens of coating cured for 14 days at 75°F shall exhibit an abrasion coefficient of at least 30 liters per mil.
 - c. When tested according to ASTM D 522, a 2 mil dry film thickness specimen cured for 14 days at 75° shall exceed 12% elongation when tested on the 1/4 inch mandrel.
 - d. Specimens cured for 14 days at 75°F and immersed for 48 hours shall exhibit less than 1% water absorption by weight.
 - e. Water Retentivity shall not exceed 0.055 grams per square centimeter when tested according to ASTM C 156.

PART 3 - EXECUTION

3.1 INSPECTION

- A.** Examine all work prepared by others to receive work of this Section. Commencement of work will be construed as complete acceptance of preparatory work by others.
 - 1. Hold Point-A pre-placement inspection shall be performed by the Contractor prior to placing concrete to assure that placement prerequisites have been accomplished.

3.2 HANDLING, STORAGE, AND PROTECTION OF MATERIALS

- A.** Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing ice. Remove improper and rejected materials immediately from point of use. Cover materials, including steel reinforcement and accessories, during construction period. Stockpile concrete constituents properly to assure uniformity throughout project. Store reinforcement above ground and protect from surface contaminants.

3.3 ERECTION OF FORMWORK, SHORING AND RESHORING

- A.** Set and maintain formwork to insure complete concrete work within tolerance limits listed in ACI 347 latest edition, "Recommended Practice for Concrete Formwork", and with following additional requirements:
 - 1. Maximum variations from plumb:
 - a. In surfaces of columns and walls:
 - 1) In any 10 feet of length: 1/4 inch
 - 2) Maximum for entire length: 1/2 inch
 - 2. Maximum variations from established position in plan shown on the drawings:
 - a. Column: 1/2 inch
 - b. Walls: 3/4 inch
 - 3. Variations in cross-sectional dimensions of columns and beams and in thickness of slabs and walls.
 - a. Minus: 1/8 inch
 - b. Plus: 1/4 inch
- B.** Before form materials can be re-used, surfaces that will be in contact with freshly cast concrete shall be thoroughly cleaned, damaged areas repaired and projecting nails withdrawn. Re-use of form material shall be subject to approval by Engineer.

3.4 PLACING OF REINFORCEMENT

- A.** Reinforcement shall be placed in accordance with requirements of CRSI 93, "Recommended Practice for Placing Reinforcing Bars" and CRSI 93, "Recommended Practice for Placing Bar Supports" and with further requirements below.
- B.** Reinforcement shall be accurately placed in accordance with Contract Documents and shall be firmly secured in position by wire ties, chairs, spacers, and hangers, each of type approved by Engineer.
- C.** Bending, welding or cutting reinforcement in field in any manner other than as shown on Drawings, is prohibited, unless specific approval for each case is given by Engineer.
- D.** Reinforcement shall be continuous through construction joints unless otherwise indicated on Drawings.
- E.** Reinforcement shall be spliced only in accordance with requirements of Contract Documents or as otherwise specifically approved by Engineer. Splices of reinforcement at points of maximum stress shall generally be avoided. Welded wire fabric shall lap six inches or one space plus two inches whichever is larger, and shall be wired together.
- F.** At time concrete is placed, reinforcement shall be free of excessive rust, scale, or other coatings that will destroy or reduce bond requirements. Reinforcement expected to be exposed to weather for a considerable length of time shall be painted with a heavy coat of cement grout. Protect stored materials so as not to bend or distort bars in any way. Bars that become damaged will be rejected.
- G.** Hold Point - Before concrete is cast, check all reinforcement after it is placed to insure that reinforcement conforms to Contract Documents and approved Shop Drawings. The Engineer shall be notified at least 36 hours prior to concrete placement and given opportunity to inspect completed reinforcement and formwork before concrete placement. Prior approval of Shop Drawings shall in no way limit Engineer's right to demand modifications or additions to reinforcement or accessories.

3.5 INSTALLATION OF EMBEDDED ITEMS

- A.** Conform to requirements of ACI 318, paragraph 6.3, "Conduits and Pipes Embedded in Concrete", and as specified below.

3.6 MIXING, CONSISTENCY, AND DELIVERY OF CONCRETE

- A.** Concrete shall be ready-mixed, produced by plant acceptable to Engineer. Hand or site mixing shall not be done. Constituents, including admixtures except certain corrosion inhibitors and superplasticizers, shall be batched at central batch plant. Admixtures shall be premixed in solution form and dispensed as recommended by manufacturer.
- B.** Central plant and rolling stock equipment and methods shall conform with Truck Mixer and Agitator Standard of Truck Mixer Manufacturer's Bureau of National Ready-Mixed Concrete Association, and Contract Documents. Consistency of concrete at time of deposit shall be as per section 2.2F.:

- C. Ready mixed concrete shall be transported to site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at site shall be within one and one-half hours after cement was first introduced into mix. Discard concrete not discharged within one and one-half hours and dispose of legally. Concrete with a temperature greater than 85 degrees F. shall not be placed. Central mixed concrete shall be plant mixed a minimum of five minutes. Agitation shall begin immediately after premixed concrete is placed in truck and shall continue without interruption until discharged. Transit mixed concrete shall be mixed at mixing speed for at least ten minutes immediately after charging truck followed by agitation without interruption until discharged. Concrete shall be furnished by a single plant unless accepted by the Engineer in writing.
- D. Retempering of concrete which has partially hardened, that is, mixing with or without additional cement, aggregates, or water, will not be permitted.

3.7 PLACING CONCRETE

- A. Inspection: Before placing concrete, inspect and complete formwork installation and coating, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Confirm that all debris, snow, ice, and standing water have been removed from the placement location.
- C. Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation within limits of construction joints, until the placing of a panel or section is completed.
 - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position during concrete placement.

3.8 FINISHING OF UNFORMED CONCRETE SURFACES

- A. Smooth troweled finish: Shall be provided where concrete flatwork is to be exposed in the finished work or is to receive resilient flooring materials, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
- B. Contractor, at his own expense, shall level depressed spots and grind high spots in concrete surfaces which are in excess of specified tolerances. Leveling materials proposed for providing proper surface shall be approved by Engineer.

3.9 CURING, SEALING AND PROTECTION

- A. General: Curing of concrete shall be in accordance with ACI 308 – Standard Practice for Curing Concrete, and the following requirements.
- B. When concrete is placed at or below ambient air temperatures of 40 degrees F. or whenever in opinion of Engineer, such or lower temperatures are likely to occur within 48 hours after placement of concrete, cold weather concreting procedures, according to ACI 306 and as specified herein, shall be followed. To this end, entire area affected shall be protected by adequate housing or covering, and heating. No salt, chemicals or other foreign materials shall be used in the mix to lower freezing point of concrete.
- C. Protect concrete work against injury from heat, cold, and defacement of any nature during construction operations.
- D. Concrete shall be treated and protected immediately after concreting or cement finishing is completed, to provide continuous moist curing above 50 degrees F. for at least seven days, regardless of ambient air temperatures.
- E. Curing compounds will not be permitted for slab and beams.
- F. Keep permanent temperature record showing date and outside temperature for concreting operations. Thermometer readings shall be taken at start of work in morning, at noon, and again late in afternoon. Locations of concrete placed during such periods shall likewise be recorded, in such manner as to show any effect temperatures may have had on construction. Copies of temperature record shall be distributed daily to Engineer.
- G. Epoxy Curing Compounds/Hardener:
 - 1. Apply the first coat of epoxy to the plastic concrete as soon as the bleed water has totally disappeared. This application shall serve a dual function: a membrane curing compound which shall retain 95% or more of the mixing water in the concrete for a minimum of seven days; and the first coat of a two-coat system to seal and protect the concrete.
 - 2. After a minimum curing period of 30 days and before the structure is opened to general use, wash the concrete with cleaning and degreasing chemical solution applied in accordance with the manufacturer's instructions and as specified herein.
 - 3. Prepare the cleaning solution in accordance with the manufacturer's instructions. Dampen concrete surface with water. Apply the prepared solution over the area to be cleaned using a soft fibered but densely filled brush. Allow the solution to remain on the surface for 3 to 5 minutes. Reapply the cleaning solution and scrub vigorously. Rinse with fresh water applied at a pressure of 400-800 psi and a volume of water per minute 5 - 10 gallons. Protect all non-masonry surfaces.
 - 4. Allow concrete to dry a minimum of 24 hours and a maximum of 48 hours before application of the second coat of epoxy.
 - 5. Pour equal quantities of Components 'A' and 'B' into a clean container. Mix thoroughly with a low speed electric drill equipped with a steel paddle. Keep individual components and mixed compound covered when material is not being used.

6. Application: Apply mixed epoxy compound in a uniform coat at the rate of approximately 200 sq. ft. per gallon. Mixed material may be sprayed with any equipment capable of spraying epoxy compounds, or it may be applied with a deep nap lamb's wool roller.
 7. Protect surface against vehicular and pedestrian traffic during curing period (24 hours at 75°F).
 8. Final Coat - Broom Finish and Wood Float Finish: Concrete is totally sealed against contaminants and resists the attack of de-icing chemicals. It may be applied at any time after the concrete has cured a minimum of 30 days and before the structure is opened to general use. Apply the epoxy compound by spray or roller at the rate of 275 to 325 sq. ft. per gallon being careful to avoid puddles or uneven application. The concrete shall exhibit a uniform gloss indicating it is totally sealed. Any areas that are dull or flat are not totally sealed. Any areas that are dull or flat are not totally sealed and shall be given a third coat.
 9. Final Coat - Steel Trowel Finish Concrete: Apply the second and final coat at any time after the concrete has cured a minimum of 30 days and before the structure is opened to general use. Apply mixed epoxy compound in a uniform coat at a rate not to exceed 200 sq. ft. per gallon. While the epoxy compound is still liquid, drop fine sand meeting the gradation requirements of ASTM C-109, vertically into the epoxy at a uniform rate of one lb. per sq. ft. Make sure entire epoxy surface is thoroughly covered. After epoxy has hardened so that it cannot be dented with a screwdriver, remove excess sand.
- H. Concrete Sealer: Apply to bridge copings, beam sets, parapets, vehicle barriers, boatwalls portal flank walls and other concrete surfaces indicated. Apply in accordance with manufacturer's instructions and the following:
1. Application of the sealer shall not alter the surface texture and shall be compatible with the use of surface finish coatings and caulking. Surface shall dry to a tack-free condition in 4 hours or less.
 2. Preparation process shall not cause any undue damage to the concrete surface, remove or alter the existing surface finish, or expose the coarse aggregate of the concrete.
 3. Concrete sealer shall be used as supplied by the manufacturer and not altered in any way. Apply onto concrete surfaces at manufacturer's recommended rate of coverage.
 4. Prevent the concrete sealer from coming in contact with open joints that have not yet been filled with joint sealant, so as to prevent any loss of bond of the joint sealant.

3.10 CLEANING

- A. Concrete surfaces shall be cleaned of objectionable stains as determined by the Engineer. Materials containing acid in any form or methods which will damage "skin" of concrete surfaces shall not be employed, except where otherwise specified.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 04800

MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the following items.

1. Concrete masonry units.
2. Mortar and grout.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type and color of the following:

1. Exposed concrete masonry units.
2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.

C. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports, per ASTM C 780 for mortar mixes required to comply with property specification.
2. Include test reports, per ASTM C 1019 for grout mixes required to comply with compressive strength requirement.

E. Tests Results: For each type of test including mortar, grout and prism tests, for approval by the Engineer.

F. UL Certificate of Compliance for fire rated concrete masonry units.

1.3 QUALITY ASSURANCE

- A.** Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- B.** Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

1.4 DELIVERY, STORAGE, AND HANDLING

- A.** Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B.** Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C.** Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D.** Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E.** Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.5 PROJECT CONDITIONS

- A.** Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1.** Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2.** Protect sills, ledges, and projections from mortar droppings.
 - 3.** Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
- B.** Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS (CMUs)

- A. Concrete Masonry Units: ASTM C 90, normalweight unless indicated otherwise manufactured to dimensions 3/8 inch less than nominal dimensions.
- B. Shapes: Provide standard shapes indicated and as required for building configuration. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- C. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen. Available products include:
 - a. Addiment Incorporated; Block Plus W-10.
 - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block.
 - c. Master Builders, Inc.; Rheopel.

2.2 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Available Products:
 - a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
 - b. Davis Colors; True Tone Mortar Colors.
 - c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

- D. Aggregate for Mortar: ASTM C 144. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
- E. Aggregate for Grout: ASTM C 404.
- F. Water: Potable.

2.3 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Available Manufacturers:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.4 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Limit cementitious materials in mortar to Portland cement [mortar cement] and lime.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N, minimum strength 75 psi.
- C. Pigmented Mortar: Use colored cement product. Pigments shall not exceed 10 percent of Portland cement by weight.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 2. Verify that foundations are within tolerances specified.
- B.** Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C.** Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A.** Thickness: Build masonry construction to provide flush alignment with finish surfaces of adjacent existing-to-remain masonry construction.
- B.** Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed. Do not use units cut to less than one-half size.
- C.** Do not install concrete masonry units with more than 5 percent damage to the face. Do not install brick units which will show defects after installation.
- D.** Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
- E.** Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- F.** Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
 - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 - 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 - 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

G. Do not retemper mortar.

3.3 MORTAR BEDDING AND JOINTING

A. Lay concrete masonry units as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.4 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
7. Clean stone trim to comply with stone supplier's written instructions.

3.5 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Masonry Waste: Remove excess clean masonry waste and legally dispose of off the Site.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 05100
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included:** This Section specifies the following items.
1. Structural steel sub-column assembly.
 2. Roof Top Unit support framing.
 3. All steel shop primed.
- B. Items To Be Furnished Only:** Furnish the following items for installation by the designated Sections:
1. Sections 04800 – MASONRY:
 - a. Anchors to be built into masonry walls.
- C. Related Work:** The following items are not included in this Section and will be performed under the designated Sections:
1. Section 09900 – PAINTING: Field finish painting of structural steel.

1.2 DEFINITIONS

- A. Structural Steel:** Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges", that support design loads.

1.3 SUBMITTALS

- A. Product Data:** For each type of product indicated.
- B. Shop Drawings:** Show fabrication of structural-steel components.
1. Include details of cuts, connections, holes, and other pertinent data.
 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld.
 3. Indicate type, size and length of bolts.
 4. Provide templates for anchors and bolts.
 5. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation.
- C. Welding Certificates:** Certificate from AWS indicating certification in type of welding required for each welder and welding operator.

D. Welding Records and Data:

1. Before welding, submit the procedure which will be used for qualifying welders and welding procedures. For procedures other than those pre-qualified in accordance with AWS D1.1, submit a copy of procedure qualification test records.
2. Submit certified copy of qualification test records for each welder, welding operator, and tacker who will be employed in the work.
3. If field welding is permitted, submit descriptive data for field welding equipment.
4. Submit all NDE records (radiographs, ultrasonic, magnetic particle) and visual inspection reports upon completion or when otherwise requested by the Engineer.

E. Qualification Data: For installer, fabricator, professional engineer, testing agency, welding inspectors, and NDE inspectors. Submit prior to starting work.

F. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Shop primers.
4. Nonshrink grout.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is certified for: Steel Building Structures (STD); or Simple Steel Bridge Structures (SBD); or Major Steel Bridges (CBR) as applicable

B. Installer Qualifications: A qualified installer with previous experience in installing structural steel.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"

D. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges"
2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2"
3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" and "Load and Resistance Factor Design Specification for Structural Steel Buildings"
4. AISC's "Specification for the Design of Steel Hollow Structural Sections"
5. AISC's "Specification for Allowable Stress Design of Single-Angle Members" and "Specification for Load and Resistance Factor Design of Single-Angle Members"
6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts"

E. Tests and Inspection

1. The Contractor will test welded connections and prepare test reports. Specialty tests shall be performed at no expense to the Authority by an independent testing laboratory approved by the Engineer. Costs of specialty tests shall be borne by the Contractor. Test reports shall be submitted to the Engineer for approval.
2. The Engineer reserves the right to inspect welded connections. Provide access to places where structural steel work is being fabricated or erected so that required inspection and testing can be accomplished at no change in Contract Price. At times, inspection may require moving or handling of steel to permit proper inspection. Notify Materials Testing Laboratory not less than 48 hours prior to start of fabrication.
3. The Engineer may inspect structural steel at the plant before shipment; however, the Engineer reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.
4. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements at the Contractor's expense. Perform additional tests, at no expense to the Authority, as may be necessary to reconfirm any non-compliance of the original work, and as may be necessary to show compliance of corrected work.
5. Specialty Tests: Nondestructive examination of welds in accordance with provisions of AWS D1.1 and ASTM Standards noted shall be made in accordance with the following schedule:
 - a. Radiographic Examination of Welds, per ASTM E94 and E142:
 - 1) Field, complete joint penetration groove welds:
 - a) 1 out of 5 (20 percent) with thickness equal to or less than 3/4 inch.
 - b) 100 percent with thickness greater than 3/4 inch.
 - 2) Shop, complete joint penetration groove welds:
 - a) 1 out of 10 (10 percent) with thickness equal to or less than 3/4 inch.
 - b) 1 out of 2 (50 percent) with thickness greater than 3/4 inch and equal to or less than 1-1/2 inches.
 - c) 100 percent for thickness greater than 1-1/2 inches.
 - b. Ultrasonic Examination, per ASTM E164: Complete joint penetration groove butt welds not accessible for radiographic examination shall be subjected to ultrasonic testing. The extent shall be the same as noted for radiographic examination. Ultrasonic examination shall be made 48 to 72 hours after welding at locations on weldments or welded joints subject to high restraint as indicated in order to check for lamellar tearing. The exact location of the areas to be inspected shall be determined with the Engineer at the time of fabrication. This examination shall be made according to the following schedule unless conditions of tearing require a greater number of tests, as directed:
 - 1) 1 out of 10 (10 percent) for thickness equal to or less than 3/4 inch.
 - 2) 1 out of 5 (20 percent) for thickness greater than 3/4 inch and equal to or less than 1-1/4 inches.
 - 3) 1 out of 2 (50 percent) for thickness greater than 1-1/4 inches.
 - c. Magnetic Particle Examination, per ASTM E709, field and shop:
 - 1) 1 out of 5 (20 percent) of complete joint penetration groove welds of tee and corner joints.

- 2) 1 out of 10 (10 percent) of partial joint penetration groove and fillet welds.
- d. Penetrant Examination, per ASTM E165: Shall be used for detecting discontinuities that are open to the surface use as appropriate.
6. Visual Examination: All welds whether otherwise examined or not shall be visually examined and faulty joints shall be marked for correction.
7. When any testing, examination or inspection reveals faulty welds, all joints of the same type shall be checked at no expense to the Authority until the integrity of the weld is assured before resuming examination.
8. After faulty welds have been corrected or repaired, they shall each be re-examined at no expense to the Authority in the manner specified for the original joint.
9. It is intended that inspections shall be performed to permit an orderly flow of completed material from the shop. Work with the Engineer to establish a schedule that will permit this.
10. Test result information shall be forwarded to the Engineer immediately after test results are available stating the acceptance or rejection of fabricated pieces in order that the repairs and re-inspection may be made as soon as possible.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 COORDINATION

- A. Coordinate and furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Channels, Angles, M-Shapes, S-Shapes, W-Shapes: ASTM A 572, Grade 50.
- B. Plate and Bar: ASTM A 572/A 572M, Grade 50.
- C. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- D. Steel Pipe: ASTM A 53, Type E or S, Grade B.

- E. Medium-Strength Steel Castings: ASTM A 27, Grade 65-35 carbon steel.
- F. High-Strength Steel Castings: ASTM A 148, Grade 80-50, carbon or alloy steel.
- G. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
- B. Threaded Rods: ASTM A 193, grade as applicable, ASTM A 153, Class C. Expansion
- C. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488. Tests shall be conducted by a qualified independent testing agency.
 - 1. Allowable Design Load: 2000 lbs. (min.) for shear
 - 2. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 3. Material for Anchors in Exterior Locations: Stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.3 MISCELLANEOUS MATERIALS

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design".
 - 1. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 - 2. Mark and match-mark materials for field assembly.
 - 3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

- E. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
4. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 SHOP CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work. Complete welds in accordance with the Contract Drawings.

1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Insufficient welds shall be rejected and corrected until required profiles are met.
4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.
5. No skip welds will be permitted for steel connections to be coated.

2.6 STEEL PRIMERS AND FINISHES

- A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for The Society for Protective Coatings (SSPC) surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 10/NACE No. 2, "Near White Metal Blast Cleaning"
2. Interiors (SSPC Zone 1A): SSPC-SP 6, "Commercial Blast Cleaning"
3. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be field welded, embedded in concrete or masonry, unless otherwise indicated. Extend priming of partially embedded members to a depth of 2 inches.
4. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel" for shop painting.

5. Comply with SSPC-PA 2, "Measurement of Dry Coating Thickness with magnetic Gages"

Zinc-Rich Primer: Urethane zinc rich primer compatible with topcoat Specified in Section 09900. Provide primer with a VOC content of 340 g/L (2.8 lb/gal.) or less per OTC ozone standards. Provide Tnemec Series 394 or Ameron 5105 or equal by DuPont or Carboline for exposed steel to be fireproofed, or Tnemec Series 901K97 Series or 90-97 or Ameron 68HS or equal by DuPont or Carboline for exposed steel to be finish painted at 3.0 mils DFT.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements. Elevations shall be verified by a surveyor licensed in the Commonwealth of Massachusetts.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges".
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of base plate.
 3. Snug-tighten or pretension anchor rods as applicable after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.

4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges".
 - D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
 - E. Splice members only where indicated.
 - F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
 - G. Do not use thermal cutting during erection unless approved by the Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1.
 - H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint indicated on the Drawings.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field high-strength bolted connections.
- B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts". When using bolted connections prime with "slip critical class B" primer as specified in this Section. All surfaces of bolted or bearing connections may be primed. When welding, hold back primer a minimum of 2 inches each side of weld.
- C. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
1. Clean and prepare surfaces by SSPC-SP 3 power-tool cleaning.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

PART 4 - MEASUREMENT AND PAYMENT

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section specifies the following items.

1. Wood furring and blocking.

1.2 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them include the following:

1. ALSC: American Lumber Standard Committee
2. AWWPA: American Wood-Preservers Association
3. DHI: Door and Hardware Institute
4. NELMA: Northeastern Lumber Manufacturers Association
5. NHLA: National Hardware Lumber Association
6. NLGA: National Lumber Grades Authority

1.3 SUBMITTALS

- A. Submit for each type of process and factory-fabricated product. Indicate component materials and dimensions, and include construction and application details.

1. Include data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

- B.** For the following products, provide compliance documentation with applicable building and state codes:

1. Preservative treated wood.
2. Fire-retardant-treated wood.
3. Power driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.

1.4 DELIVERY, STORAGE AND HANDLING

- A.** Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.
- B.** Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

- A.** Lumber: Provide lumber graded by DOC PS 20 standards and applicable rules of grading agencies. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, produce minimum dressed sizes for dry lumber.
 4. Provide dressed lumber sanded four sides (S4S) unless otherwise indicated.

2.2 WOOD PRESERVATIVE-TREATED MATERIALS

- A.** Preservative Treatment by Pressure Process complying in requirements of AWPA C2.
1. Preservative Chemicals: Acceptable to the Authority and containing no arsenic or chromium.
- B.** Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- C.** Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D.** Application: Treat miscellaneous carpentry, including the following:

1. Wood sills, sleepers, blocking furring and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPAC20 (Lumber) and AWPAC27 (Plywood).
 1. Use treatment that does not promote corrosion of metal fasteners.
 2. Use exterior type for exterior locations and where indicated.
 3. Use Interior Type A, High Temperature for enclosed roof framing and where indicated.
 4. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of Underwriters Laboratory.
 1. All lumber and plywood to have a flame spread rating of 25 or less when tested in accordance with ASTM E-84, Standard Test Method for Surface Burning Characteristics of Building Materials
- C. Application: Treat concealed miscellaneous carpentry, including but not limited to the following:
 1. Concealed blocking.
- D. Products: Subject to compliance with requirements, provide products by one of the following:
 1. Dricon; a Division of Hickson Corporation.
 2. Hoover Treated Wood Products.
 3. Bestway of New England.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking
 2. Nailers
 3. Cants
 4. Furring
- B. For items of dimension lumber size, provide Construction or No.2 grade lumber with 15 percent maximum moisture content and any of the following species:
 1. Hem-fir (north); NLGA
 2. Spruce-Pine-fir; NLGA
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Hem-fir or hem fir (North), Construction or 2 Common grade;NLGA.
 2. Spruce-pine-fir (south) or spruce-pine fir, Construction or 2 common grade; NELMA or NLGA
- D. For blocking not used for attachment of other construction, utility, stud, or No.3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with the attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.
- G. Application: Provide kiln dried lumber in the following locations:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 316 stainless steel.
- B. Nails, Brads, and Staples: Complying with the requirements of ASTM F 1667.
- C. Power-Driven Fasteners: Complying with NES NER-272.
- D. Wood Screws: Complying with the requirements of ASME B18 .6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: Complying with the requirements ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material be fastened.
- F. Lag Bolts: Complying with ASEM B18. 2.1.
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material : Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F 594 Alloy group 1 or 2.

PART 3 - EXECUTION

3.1 GENERAL

- A.** Set carpentry to required levels and lines with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking and similar supports to comply with requirements for attaching other construction.
- B.** Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items and trim.
- C.** Sort and select lumber so that natural characteristics will not interfere with installation or fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- D.** Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
- E.** Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NER-272 for power driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule", in the International Building Code.
- F.** Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A.** Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B.** Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

- A.** Install level and plumb with closure strips at edges an openings. Shim with wood as required for tolerance of finish work.
- B.** Furring to Receive Plywood: Install 1-by-3 inch nominal-size furring vertically 24 inches o.c.

3.4 FIRE- RETARDANT-TREATED (FRT) MATERIALS INSTALLATION

- A. Cutting to length, drilling holes, joining cuts and light sanding are permissible. It is not necessary to field treat cut ends to maintain flame spread rating.
 - 1. Ripping, milling and surfacing of FRT lumber is not permitted.
 - 2. FRT Plywood can be cut in either direction without loss of fire protection

3.5 PROTECTION

- A. Protect wood that has been treated with inorganic born (SBX) from weather. If, despite protection inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the following.

1. Through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
2. Fire-resistive joint systems for floor, wall, and head-of-wall joints.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 07920 - JOINT SEALANTS: Standard joint sealers.
2. Section 15400 - PLUMBING SYSTEMS: Piping penetrations.
3. Section 15500 - FIRE PROTECTION: Fire-suppression piping penetrations.
4. Section 15600 - HEATING, VENTILATING, AND AIR CONDITIONING: Duct and piping penetrations.
5. Division 16 - ELECTRICAL: Cable and conduit penetrations.

1.2 PERFORMANCE REQUIREMENTS

A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated, as determined per ASTM E 814.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - a. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 - 1. Types of penetrating items.
 - 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 - 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
- D. Qualification Data: For Installer and Inspection and Testing Agency.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Either a firm that has been approved by FM Global according to FMG 4991, "Approval of Firestop Contractors" or a firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction of a minimum of five projects with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 - 1. Firestop tests are performed by a qualified testing and inspecting agency.
 - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in Part 1 "Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed in the UL "Fire Resistance Directory".

1.5 DELIVERY, STORAGE, AND HANDLING

- A.** Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B.** Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A.** Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B.** Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A.** Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B.** Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C.** Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been inspected by the building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A.** Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Hilti, Inc.
 - 2. BioFireshield; RectorSeal Corporation.
 - 3. 3M; Fire Protection Products Division.
 - 4. Or approved equal.

2.2 FIRESTOPPING MATERIALS

- A.** Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B.** Materials: Provide through-penetration firestop systems containing primary materials and fill materials which are part of the tested assemblies indicated in the Through-Penetration Firestop System Schedule at the end of Part 3. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill", "void" or "cavity" materials.
- C.** Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with requirements in this Section. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated

2.3 MIXING

- A.** For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A.** Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with requirements in this Section and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.5 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.6 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

CONCRETE FLOORS		UL-CLASSIFIED SYSTEMS			CONCRETE OR BLOCK WALLS		UL-CLASSIFIED SYSTEMS		
TYPE OF PENETRANT	F-RATING HR	HILTI	3M	BIO-FIRE	TYPE OF PENETRANT	F-RATING	HILTI	3M	BIO-FIRE
CIRCULAR BLANK OPENINGS	1	FA 0006, CAJ 0070	CAJ 0009	CAJ 0056	CIRCULAR BLANK OPENINGS	1	CAJ 0055, CAJ 0070	CAJ 0009	CAJ 0056
	2	FA 0006, CAJ 0070	CAJ 0009	CAJ 0056		2	CAJ 0055, CAJ 0070	CAJ 0009	CAJ 0056
	3	CAJ 0055	CAJ 0009	CAJ 0056		3	CAJ 0055	CAJ 0009	CAJ 0056
SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, CAJ 1278, FA 1017	CAJ 1058	CAJ 1264	SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, CAJ 1278,	CAJ 1058	CAJ 1264
	2	CAJ 1226, CAJ 1278, FA 1017	CAJ 1058	CAJ 1264		2	CAJ 1226, CAJ 1278,	CAJ 1058	CAJ 1264
	3	CAJ 1226, CAJ 1278, FA 1017	CAJ 1058	CAJ 1264		3	CAJ 1226, CAJ 1278,	CAJ 1058	CAJ 1264
	4	CAJ 8095, CBJ 1034	CAJ 1044	N/A		4	CAJ 8095, CBJ 1034, WJ 1042	CAJ 1044	WJ 1064
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, ENT)	1	CAJ 2109, CAJ 2168, FA 2054, FA 2067	CAJ 2189, CAJ 2117, CAJ 2027	CAJ 2131	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, ENT)	1	CAJ 2109, WJ 2108, WJ 2121	CAJ 2189, CAJ 2117, CAJ 2027	CAJ 2131
	2	CAJ 2109, CAJ 2168, FA 2054, FA 2067	CAJ 2189, CAJ 2117	CAJ 2131		2	CAJ 2109, WJ 2108, WJ 2121	CAJ 2189, CAJ 2117, CAJ 2027	CAJ2131
	3	CAJ 2109, CAJ 2168, FA 2054,	CAJ 2005, CAJ 2117	CAJ 2152		3	CAJ 2109, CAJ 2168, WJ 2091	CAJ 2005, CAJ 2117, CAJ 2027	CAJ2152
	4	N/A*	N/A*	N/A		4	WJ 2091	N/A*	N/A

SINGLE OR BUNDLED CABLES	1	FA 3007, CAJ 3095,	CAJ 3021	CAJ 3103	SINGLE OR BUNDLED CABLES	1	CAJ 3095, WJ 3060 WJ 3074	CAJ 3021	WJ 3071
	2	FA 3007, CAJ 3095,	CAJ 3021	CAJ 3103		2	CAJ 3095, WJ 3060 WJ 3074	CAJ 3021	WJ 3071
	3	FA 3007, CAJ 3095,	CAJ 3030	CAJ 3103		3	CAJ 3095, WJ 3050	CAJ 3030	CAJ 3103
	4	N/A*	N/A*	N/A		4	WJ 3050	N/A*	N/A
CABLE TRAY	1	CAJ 4034, CAJ 4054, CAJ 4017	CAJ 4003	CAJ 4048	CABLE TRAY	1	CAJ 4034, CAJ 4054, WJ 4016,	CAJ 4003	CAJ 4048
	2	CAJ 4034, CAJ 4054, CAJ 4017	CAJ 4003	CAJ 4048		2	CAJ 4034, CAJ 4054, WJ 4016,	CAJ 4003	CAJ 4048
	3	CAJ 4034, CAJ 4017	CAJ 4003	CAJ 4048		3	CAJ 4034, WJ 8007	CAJ 4003	CAJ 4048
	4	N/A*	N/A*	N/A		4	WJ 8007	N/A*	N/A
SINGLE INSULATED PIPES	1	FA 5016, FA 5017, CAJ 5090, CAJ 5091,	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5082	SINGLE INSULATED PIPES	1	CAJ 5090, CAJ 5091, WJ 5042	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5082
	2	FA 5016, FA 5017, CAJ 5090, CAJ 5091,	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5082		2	CAJ 5090, CAJ 5091, WJ 5042	CAJ 5080, CAJ 5024, CAJ 5017	CAJ 5082
	3	FA5016, CAJ 5061, CAJ 5090,	CAJ 5024, CAJ 5017	CAJ 5006		3	CAJ 5090, CAJ 5091,	CAJ 5024, CAJ 5017	CAJ 5006
	4	CBJ 5006	N/A*	N/A		4	WJ 5028, CBJ 5006	N/A*	N/A
ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6026	ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6026
	2	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6026		2	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	CAJ 6026
	3	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	N/A		3	CAJ 6006, CAJ 6017	CAJ 6001, CAJ 6002	N/A

NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	CAJ 7036	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046, WJ 7029, WJ 7022	CAJ 7003, CAJ 7021	CAJ 7036
	2	CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	N/A		2	CAJ 7046, WJ 7029, WJ 7022	CAJ 7003, CAJ 7021	CAJ 7036
	3	CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	N/A		3	CAJ 7046 CAJ 7051	CAJ 7003, CAJ 7021	N/A
MIXED PENETRANTS	1	CAJ 8056, CAJ 8095, CAJ 8099	CAJ 8001, CAJ 8013	CAJ 8051	MIXED PENETRANTS	1	CAJ 8096, CAJ 8099 WJ 8007	CAJ 8001, CAJ 8013	CAJ 8051
	2	CAJ 8056, CAJ 8095, CAJ 8099	CAJ 8001, CAJ 8013	CAJ 8051		2	CAJ 8096, CAJ 8099 WJ 8007	CAJ 8001, CAJ 8013	CAJ 8051
	3	CAJ 8056, CAJ 8095, CAJ 8099	CAJ 8001, CAJ 8013	CAJ 8051		3	CAJ 8099 WJ 8007	CAJ 8001, CAJ 8013	CAJ 8051
	4	CAJ 8095	N/A*	N/A		4	WJ 8007	N/A*	N/A

WOOD FLOORS		UL-CLASSIFIED SYSTEMS			GYPSUM WALLBOARD ASSEMBLIES		UL-CLASSIFIED SYSTEMS		
TYPE OF PENETRANT	F-RATING	HILTI	3M	BIO-FIRE	TYPE OF PENETRANT	F-RATING	HILTI	3M	BIO-FIRE
METAL PIPES OR CONDUIT	1	FC 1009, FC 1059	FC 1002	FC 1031	METAL PIPES OR CONDUIT	1	WL 1054, WL 1164	WL 1146	WL 1115
	2	FC 1009, FC 1059	FC 1002	FC 1031		2	WL 1054, WL 1164	WL 1010, WL 1146	WL 1115
NON-METALLIC PIPE OR CONDUIT	1	FC 2025, FC 2126	FC 2024	FC 2059	NON-METALLIC PIPE OR CONDUIT	1	WL 2078, WL 2075, WL 2128	WL 2088, WL 2002	WL 2133
	2	FC 2025, FC 2126	FC 2024	FC 2059		2	WL 2078, WL 2075, WL 2128	WL 2088, WL 2002	WL 2133
SINGLE OR BUNDLED CABLES	1	FC 3012, FC 3044	FC 3017	FC 3050	SINGLE OR BUNDLED CABLES	1	WL 3065	WL 3032, WL	WL 3153
	4					4	WL 2184, WL 2245	N/A*	

								3030	
						2	WL 3065	WL 3032, WL 3030	WL 3153
						4	WL 3139	N/A*	
	2	FC 3012	FC 3017	N/A	CABLE TRAY	1	WL 4011, WL 4019	WL 4004	WL 4032
						2	WL 4011, WL 4019	WL 4004	WL 4032
						4	WL 8014	N/A*	
INSULATED PIPES	1	FC 5004, FC 5036, FC 5037	FC 5014	FC 5025	INSULATED PIPES	1	WL 5029, WL 5096	WL 5040, WL 5001, WL 5032	WL 5062
						2	WL 5029, WL 5096	WL 5040, WL 5001, WL 5032	WL 5062
	2	FC 5004	N/A*	FC 5025		4	WL 5073	N/A*	
						4	WL 5073		

NON- INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	FC 7013	FC 7001		NON- INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	WL 7040, WL 7042	WL 7008	WL 7037
						2	WL 7040, WL 7042	WL 7008, WL 7013, WL 7016	WL 7037
						4			
MIXED PENETRANTS	1	FC 8014, FC 8026	FC 8013	N/A	MIXED PENETRANTS	1	WL 8004, WL 8013	WL 8010	WL 8017
						2	WL 8004, WL 8013	WL 8010, WL 8002	WL 8017
	2	N/A*	N/A*	N/A		4	WL 8014	N/A*	
						4	WL 8014		

* No UL-Classified system is available as of August 2003. Engineer Judgement Drawing Required

NOTES:

1. Jobsite conditions of each through-penetration firestop system must meet all details of the UL-Classified System selected.

2. If jobsite conditions do not match any UL-classified systems in the schedules above, contact firestop manufacturer for alternative systems or Engineer Judgement Drawings.
3. Coordinate work with other trades to assure that penetration opening sizes are appropriate for penetrant locations, and vice versa.
4. For 3-hour rated gypsum walls, contact the firestop manufacturer for a UL-classified system or engineer judgement drawing.
5. The Contractor shall verify that the schedule is current at the time of construction, and that each referenced system is suitable for the intended application.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 07920

JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the following:
 - 1. Joint sealants and fillers for interior and exterior applications.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 09500 - ACOUSTICAL TILE CEILINGS: Sealing edge moldings at perimeters of acoustical ceilings.

1.2 PERFORMANCE REQUIREMENTS

- A.** Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B.** Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

- A.** Product Data: For each joint-sealant product indicated.
- B.** Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C.** Qualification Data: For Installer.
- D.** Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in Part 1 "Quality Assurance" Article.
- E.** Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

- F. Field Test Report Log: For each elastomeric sealant application.
- G. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 4. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than or greater than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
 - 5. When substrates have not cured sufficiently.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not

comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Colors of Exposed Joint Sealants: As indicated by manufacturer's designations.

2.2 JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Elastomeric sealants shall be nonstaining to porous substrates. Provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- D. Single-Component Neutral-Curing Silicone Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation; 790.
- b. GE Silicones; SilPruf LM SCS2700.
- c. Tremco; Spectrem 1.
- d. Pecora Corporation; 864.

2. Extent of Use: Joints in exterior vertical and soffit surfaces.

E. Multicomponent Pourable Urethane Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. Bostik Findley; Chem-Calk 550.
- b. Meadows, W. R., Inc.; POURTHANE.
- c. Pecora Corporation; Urexpan NR-200.
- d. Tremco; THC-901.

2. Extent of Use: Joints in exterior horizontal surfaces.

F. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dow Corning Corporation; 786 Mildew Resistant.
- b. GE Silicones; Sanitary SCS1700.
- c. Tremco; Tremsil 200.

2. Extent of Use: Sanitary joints at toilet rooms.

G. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. Bostik Findley; Chem-Calk 600.
- b. Pecora Corporation; AC-20+.
- c. Sonneborn, Division of ChemRex Inc.; Sonolac.
- d. Tremco; Tremflex 834.

2.3 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin). O (open-cell material). B (bicellular material with a surface skin) or any of the preceding

types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include concrete, masonry and unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following metal, glass, porcelain enamel and glazed surfaces of ceramic tile.
- B. Joint Priming:** Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.**
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove excess material.
 4. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.**
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:**
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

4. Install in uniform continuous ribbons without gaps or air pockets.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4 REPAIR AND CLEANING

- A. Remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.
- B. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 08711

DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the following items.
 - 1. Electrified door hardware.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Division 16 – ELECTRICAL; power for electrified door hardware and interface with building control and security systems.

1.2 SUBMITTALS

- A.** Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B.** Shop Drawings: Details of electrified door hardware, indicating the following:
 - 1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. System schematic.
 - b. Point-to-point wiring diagram.
 - c. Riser diagram.
 - d. Elevation of each door.
 - 2. Detail interface between electrified door hardware and fire alarm access control and building control and security systems.
- C.** Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.

3. Content: Include the following information:

- a. Type, style, function, size, label, hand, and finish of each door hardware item.
- b. Manufacturer of each item.
- c. Fastenings and other pertinent information.
- d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
- e. Explanation of abbreviations, symbols, and codes contained in schedule.
- f. Mounting locations for door hardware.
- g. Door and frame sizes and materials.
- h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

- 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.

E. Qualification Data: For firms and persons specified in Part 1 "Quality Assurance" Article.

1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.

F. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.

G. Warranties: Special warranties specified in this Section.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor and Engineer about door hardware and keying.

1. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material,

design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

- a. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
 1. Electrified Door Hardware Qualifications: Experienced in providing consulting services for electrified door hardware installations.
- D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.
- E. Regulatory Requirements: Comply with provisions of the following:
 1. Where indicated to comply with accessibility requirements, comply with Massachusetts Architectural Access Board and the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," as follows:
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf for not more than 3 seconds.
 - c. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.

- d. Thresholds: Not more than 1/2 inch high.
- 3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key control system.
 - 4. Address for delivery of keys.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
 - 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 - 2. Review sequence of operation for each type of electrified door hardware.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review required testing, inspecting, and certifying procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.5 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control and building control system.

1.6 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive the Authority of other rights the Authority may have under other provisions of the Contract Documents and shall

be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of operators and door hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
- D. Warranty Period for Manual Closers: Ten years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for the Authority's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Scheduled and acceptable manufacturers must provide all the functions and features of the specified product or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Manufacturers
Door Closers & Auto Operators	LCN (LCN)	Norton, Sargent

- B. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- C. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Engineer's approval.

2.2 MATERIALS

- A. Fasteners
 - 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

2. Furnish non-corrosive screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely.
4. All hardware shall be installed with the fasteners provided by the hardware manufacturer.

B. Automatic Operators:

1. Where low kinetic energy, as defined by ANSI Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide pneumatically powered operators complying with the 1990 ADA guidelines for opening force and time to close standards.
2. Full closing force shall be provided when the power operation cycle ends.
3. Locate power unit and exhaust away from door to minimize noise and vibration in pedestrian areas.
4. All power operator systems shall include the following features and functions:
 - a. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electric Code, section 725-31.
 - b. When an obstruction or resistance to the opening swing is encountered, the operator will continue attempting to open the door. If the obstruction or resistance remains, the operator will again pause the door.
 - c. The operator will be designed to prevent damage to the mechanism if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
5. All covers, mounting plates, and arm systems shall be powder coated and successfully pass a minimum of 100 hours of salt-spray testing as outlined in ANSI Standard A156.18.
6. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
7. Provisions in the control box or module shall provide control (inputs and outputs) for; electric strike delay, auxiliary contacts, sequential operation, fire alarm systems, actuators, swing side sensors, and stop side sensors.
8. Automatic operators meeting this specification: LCN 2600 Series.

2.3 FINISHES

- A. With the exception of all items listed below, the finish of all hardware shall be US26D - satin chrome or US32D - satin stainless steel.
- B. Exceptions are as follows:
 1. Door Closers - aluminum powder coat finish.
 2. Coordinators - prime painted.
 3. Thresholds - mill finish aluminum.
 4. Weatherstrip & Sweeps - clear anodized aluminum.
 5. Silencers - grey.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Engineer.
 - 1. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

3.4 ADJUSTING

- A.** Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.
- B.** Six-Month Adjustment: Six months after date of Substantial Completion, Installer shall perform the following:
 - 1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
 - 2. Consult with and instruct the Authority's personnel on recommended maintenance procedures.
 - 3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.5 CLEANING AND PROTECTION

- A.** Clean adjacent surfaces soiled by door hardware installation.
- B.** Clean operating items as necessary to restore proper function and finish.
- C.** Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.6 HARDWARE SCHEDULE

- A.** General: Provide hardware for each door to comply with requirements of this Section, hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.
 - 1. Hardware sets indicate quantity, item, manufacturer and product designation, and size as applicable.
- B.** HARDWARE SET NO. 1 – Riverside Existing Women Toilet Room Door RIV-01:
 - 1. Power Operator: 1 each, Horton 7100 x C1260-4 x Sedco 730. Coordinate with Division 16 to verify power characteristics. Locate push plates surface mounted at 3'-0" AFF to center line.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 09300

TILE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the following items:

1. Slip-resistant Floor tile.
2. Wall tile.
3. Stone thresholds installed as part of tile installations.
4. Waterproof membrane for thin-set tile installations.
5. Crack-suppression membrane for thin-set tile installations.
6. Surface preparation for tile and accessories.
7. Installation of access doors, furnished under mechanical and electrical sections.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 03353 - CAST-IN-PLACE CONCRETE (LIMITED APPLICATIONS); monolithic slab finishes specified for tile substrates.
2. Section 07920 - JOINT SEALANTS; sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on bathroom floor and shower floor surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Bathroom and Shower Floor Surfaces: Minimum 0.6.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:

1. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches square and mounted on rigid panel. Use grout

of type and in color or colors approved for completed work. Include sealant specified in Section 07920 - JOINT SEALANTS, in color approved for completed work.

2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch lengths.
4. Metal edge strips in 6-inch lengths.

D. Qualification Data: For Installer.

E. Material Test Reports: For each tile-setting and -grouting product.

F. Installation Bonding Report: Including dates sounding test performed and remedial action taken.

1.4 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:

1. Stone thresholds.
2. Waterproofing.
3. Joint sealants.
4. Cementitious backer units.
5. Metal edge strips.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store liquid additives in unopened containers and protected from freezing.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 TILE SCHEDULE

- A. Floor Tile FT-1: Interior floor installation on waterproof membrane over concrete; thin-set mortar; TCA F122 and ANSI A108.5.
1. Tile Type: Unglazed ceramic mosaic tile as selected by Engineer.
 2. Thin-Set Mortar: Latex-Portland cement mortar.
 3. Grout: Polymer-modified unsanded grout.
 4. Joint Width: 1/16 inch.
- B. Wall Tile Installation WT-1: Interior wall installation over sound, dimensionally stable masonry or concrete; thin-set mortar; TCA W202 and ANSI A108.5.
1. Tile Type: Glazed ceramic tile as selected by Engineer.
 2. Thin-Set Mortar: Latex-Portland cement mortar.
 3. Grout: Polymer-modified unsanded grout.
 4. Joint Width: 1/16 inch.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in this Section.
- C. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- E. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes selected from manufacturer's standard shapes.
- F. Marble Thresholds: Uniform, fine- to medium-grained white stone with gray veining, ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241

and with honed finish. Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.

- G. Waterproofing and Crack Suppression Membranes: Manufacturer's standard product that complies with ANSI A118.10.
- H. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- I. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.3 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Section 07920 - JOINT SEALANTS.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 - 1. Available Products or equal:
 - a. Dow Corning Corporation; Dow Corning 786.
 - b. GE Silicones; Sanitary 1700.
 - c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - d. Tremco, Inc.; Tremsil 600 White.
- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
 - 1. Available Products or equal:
 - a. Bostik; Chem-Calk 550.
 - b. Mameco International, Inc.; Vulkem 245.
 - c. Pecora Corporation; NR-200 Urexpan.
 - d. Tremco, Inc.; THC-900.

2.4 MIXING MORTARS AND GROUT

- A.** Mix mortars and grouts to comply with referenced standards, compressive strength requirements and mortar and grout manufacturers' written instructions.
- B.** Add materials, water, and additives in accurate proportions.
- C.** Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Engineer.
- B.** Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A.** Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B.** Provide concrete and CMU substrates for tile floors and walls that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C.** Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

- A.** ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials, to methods indicated in ceramic tile installation schedules, and resistance to deleterious substances.
- B.** TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C.** Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D.** Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E.** Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F.** Lay out tile wainscots to next full tile beyond dimensions indicated.
- G.** Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07920 - JOINT SEALANTS.
- H.** Grout tile to comply with requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-Portland cement; dry-set, commercial Portland cement; and latex-Portland cement grouts), comply with ANSI A108.10.
 - 2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.

3.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATION

- A.** Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B.** Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

- C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
 - 1. Perform sounding test by method using a chain dragged over the surface. Remove and reset tiles which fail the sounding test.
- B. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated. Set thresholds in latex-Portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.
- C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.6 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

3.7 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed. After seven days, cover areas subject to construction traffic with heavy cardboard.

- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 09500

ACOUSTICAL TILE CEILING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the following items:
 - 1. New acoustical tile (panel) ceilings and suspension grid systems.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Division 15 – MECHANICAL, for fire protection devices, duct registers and grilles installed in acoustical ceilings.
 - 2. Division 16 – ELECTRICAL, for lighting fixtures and fire protection devices installed in acoustical ceilings.

1.2 PERFORMANCE REQUIREMENTS

- A.** Seismic Design: Provide ceiling suspension systems as required for seismic load Group II, Seismic Performance Class "C".
- B.** Structural Performance: Provide ceiling suspension systems to withstand a uniform applied load of 10 psf over entire area, or an applied load of 40 lb at any framing member, without permanent deflection in excess of 1/180 of span, or exceeding the allowable design working stress of the materials involved, including anchors and connections.

1.3 SUBMITTALS

- A.** General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B.** Product Data: For each type of product indicated.
- C.** Coordination drawings for reflected ceiling plans, drawn accurately to scale and coordinating penetrations and ceiling mounted items. Show the following:
 - 1. Ceiling suspension members.
 - 2. Ceiling mounted items including light fixtures; air outlets and inlets; sprinkler heads;; column penetrations; and other junctures with adjoining construction.
 - 3. Scale: 1/8 inch = 1' - 0".

- D. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and patterns available for each type of material indicated.
- E. Samples for verification purposes in form of actual acoustical units or sections of units and 12 inch lengths of suspension system, showing color texture, and pattern available for each type of unit indicated.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling component from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
 - 1. Obtain suspension system from same manufacturer that produces acoustical ceiling units.
- B. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and fire suppression system components.
- C. Fire Performance Characteristics: Provide acoustical ceilings that are identical to those tested for the following fire performance characteristics, per ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
 - a. Flame Spread: 15 or less.
 - b. Smoke Developed: 15 or less
- D. Pre-installation Conference: Attend pre-installation conference at project site. Review the following issues related to ceiling installation work:
 - 1. Phasing and sequencing plans for installation.
 - 2. Schedule for installation.
 - 3. Protection of persons and property during work of this Section.

1.5 PROJECT CONDITIONS

- A. All spaces shall be fully occupied throughout construction. Maintain access through all buildings; provide protection of occupants and building contents during work of this Section.

1.6 SEQUENCING AND SCHEDULING

- A. Schedule installation of ceiling system in sequence with related elements of the Work specified in other Sections.

- B. Coordinate work of this Section with interfacing and adjoining work for proper sequencing of each installation. Minimize time that spaces are left with unfinished ceilings.

- 1. Maintain temporary lighting and HVAC services in occupied areas throughout ceiling installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.
 - 1. Acoustical Ceiling Panels: Furnish quantity of full size units equal to 1 percent of amount installed

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
 - 1. Metal Suspension Systems:
 - a. Chicago Metallic Corp.
 - b. Armstrong World Industries.
 - c. USG Interiors.
 - d. Or approved equal
 - 2. Ceiling Tiles:
 - a. Chicago Metallic Corp.
 - b. Armstrong World Industries.
 - c. USG Interiors.
 - d. Celotex Corp.
 - e. Or approved equal
- B. Design Concept: In order to indicate requirements and establish an aesthetic standard for the work, the specifications are based on a specific manufacturer's styles and models of acoustic tile ceiling and suspension system.

1. Other manufacturers' products may be accepted provided they meet the specified product requirements, are equal in performance to those specified, and are aesthetically similar to the specified products, as determined by the Architect.

2.2 TYPE 1 – MINERAL-BASE ACOUSTICAL PANELS

- A. Lightly Textured Pattern: Units fitting ASTM E 1264 pattern designation G, with other characteristics as follows:
 1. Edge Detail: 1/4" wide reveal to fit flange of exposed semi-recessed grid members.
 2. Size: 24 inches by 24 inches by 3/4 inch-thick.
 3. Color: White.
- B. Basis of Design:
 1. Type 1 System: "Acoustone Frost", with "Fineline" edge, by USG Interiors, Inc.

2.3 TYPE 2 – METAL ACOUSTICAL PANELS

- A. Material: Electrogalvanized steel, fitting ASTM E 1264 Type XX pattern designation C perforated, with other characteristics as follows:
 1. Size: 24 inches by 24 inches by 0.021" inch-thick.
 2. Finish and Color: Powder-coated, White.
- B. Basis of Design:
 1. Type 2 System: "Metalworks Vector Exterior", by Armstrong World Industries.

2.4 METAL SUSPENSION SYSTEMS

- A. Standard for Metal Suspension Systems: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Type 1 System:
 1. Profile: 9/16-inch narrow profile exposed grid.
 - a. Face Design: Flush capped faces without slot or reveal, with device built into runners to center panels in openings.
 2. Finishes and Colors: Provide manufacturer's standard factory applied finish, color White.
 3. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated.
 4. Basis of Design: "Centricitee" Grid, Donn Suspension Systems, Div. of USG, Inc.
- C. Type 2 System:

1. Duty Classification: Heavy-duty.
2. Profile: 15/16-inch profile exposed grid.
 - a. Face Design: Flush capped faces without slot or reveal, with device built into runners to center panels in openings.
3. Material: Hot dipped galvanized steel.
4. Finishes and Colors: Provide manufacturer's standard factory applied finish, color White.
5. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated.
6. Basis of Design: "Prelude XL", by Armstrong World Industries..

2.5 HANGERS, FASTENERS AND ACCESSORIES

- A. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- B. Angle Hangers: For suspension from bar joists, angles with legs not less than 7/8 inch wide, formed with 0.0365 inch thick galvanized steel sheet complying with ASTM A 446, Coating Designation G90, with bolted connections and 5/16 inch diameter bolts.
- C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.
 1. Gage: Provide wire sized so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 0.106 inch diameter (12 gage).
- D. Sealant: Paintable acrylic-latex finish sealant specified in Section 079200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which ceiling system attaches or abuts for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans.
 1. Where reflected ceiling plans show tile pattern with less than half width units, seek clarification from Architect prior to starting work.

- B. Coordination with other Trades: Do not begin work of this Section until above ceiling work installed by other trades is completed, inspected, and tested. Cooperate with Contractor and other trades for scheduling work that must be performed after installation of grid suspension system and prior to installation of ceiling tiles.

3.3 INSTALLATION

- A. General: Install acoustical ceiling systems to comply with ASTM C 636 and ASTM E 580 installation standards, per manufacturer's instructions and CISCA "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building structural members and as follows.
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.
 2. Where width of construction within ceiling plenum produces hanger spacing that interfere with the location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 3. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached as well as for type of hanger involved.
 4. Secure wire hangers by looping and wire tying.
 5. Space hangers not more than 4' - 0" o.c. along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8 inches from ends of each member.
 6. Install grid plumb, level and in true alignment with abutting wall construction
- C. Install concealed diagonal seismic bracing to comply with ASTM E 580. Use wire ties braced in all four directions to prevent sway. Do not use diagonal bracing for framing support.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical units.
1. Sealant Bed: If required by variation in wall surface, apply continuous ribbon of finish sealant on back of vertical leg before installing moldings; fill gaps and joint between molding and wall surface.
 2. Screw-attach moldings to substrate at intervals not over 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8-inch in 12' 0". Miter corners accurately and connect securely.
- E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations. Cut around openings for lighting and other electrical devices.
1. Field or shop-cut edges shall match factory-cut edges. Provide edge tiles with edge reveal field or shop-cut to sit in proper relation to grid as full-size units.
 2. Install hold down clips in areas indicated for fire ratings, or where required by governing regulations for code compliance; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.4 ADJUSTMENT AND CLEANING

- A.** If required, adjust framing supports after completion of other trade work to insure ceiling system is level and square, with panels centered in framing openings. Replace damaged components or work that does not appear uniform and level.
- B.** Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A.** Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the following items.
1. Field painting of exposed new and existing interior items and surfaces.
 2. Pavement markings.
 3. Surface preparation for painting.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 05100 - STRUCTURAL STEEL: Shop priming structural steel.

1.2 DEFINITIONS AND EXTENT

- A.** General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 3. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.
- B.** This Section includes surface preparation and field painting of exposed new and existing interior items and surfaces.
1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- C.** Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Engineer will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include, but are not limited to the following factory-finished components:
 - a. Metal toilet enclosures.
 - b. Finished mechanical and electrical equipment.
 - c. Light fixtures.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 SUBMITTALS

A. Product Data: For each paint system indicated, include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit two eight inch by 12 inch Samples for each type of finish coating for Engineer's review of color and texture only.

C. Qualification Data: For Applicator.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. Mockups: Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in Painting and Decorating Contractors of America PDCA P5. Duplicate finish of approved sample Submittals.
 1. Engineer will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a. Wall Surfaces: Provide samples on at least 100 sq. ft.
 - b. Small Areas and Items: Engineer will designate items or areas required.
 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - a. After finishes are accepted, Engineer will use the room or surface to evaluate coating systems of a similar nature.
 3. Final approval of colors will be from benchmark samples.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.

7. Color name and number.
 8. VOC content.
- B.** Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F and a maximum ambient temperature of 95 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.6 PROJECT CONDITIONS

- A.** Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- B.** Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- C.** Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 PAINT MATERIALS, GENERAL

- A.** Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B.** Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B.** Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Engineer about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

- A.** General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B.** Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C.** Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats or tie-coats over incompatible primers or remove and reprime.
 - 2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation to remove.
 - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine pH of surfaces using pH indicating papers and distilled water and perform moisture vapor transmission testing for concrete floors in accordance with ASTM F 1869 and moisture tests on concrete walls in accordance with ASTM D

4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method. For masonry walls, use a moisture meter approved by the coating manufacturer. Follow the selected and approved coating manufacturers recommendations for acceptable pH values, moisture vapor transmission values (in lbs. of moisture per 24 hours per 1,000 SF), and moisture meter values (for masonry). If these values are not acceptable, do not paint surfaces until moisture levels are acceptable or additional surface preparation has been performed and the pH values measured are acceptable

- c. Clean concrete floors to be painted with shot blast equipment.
3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with The Society for Protective Coating's (SSPC) recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3, SSPC-SP 10/NACE No. 2, or SSPC-SP 12 Water Jetting at 45,000 psi as specified in the Paint Schedule in this Section.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Treat existing painted surfaces with surface preparation methods recommended by coating manufacturer and in accordance with the coating schedule.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting:** Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures:** Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness:** Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work:** Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:**
1. Uninsulated metal piping.
 2. Uninsulated plastic piping.
 3. Pipe hangers and supports.
 4. Tanks that do not have factory-applied final finishes.

5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

G. Electrical items to be painted include, but are not limited to, the following:

1. Switchgear.
2. Panelboards.
3. Electrical equipment that is indicated to have a factory-primed finish for field painting.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, , laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Engineer.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in Painting and Decorating Contractors of America PDCA P1.

3.6 PAINT SCHEDULE

- A. Schedule: Provide products and number of coats specified. Use of manufacturer's proprietary product names to designate colors, materials, generic class, standard of quality and performance criteria is not intended to imply that products named are required to be used to the exclusion of equivalent performing products of other manufacturers.

- B. Interior Paint Schedule for High Performance Coatings:

1. New and Previously-Painted Interior Concrete Block, Epoxy Coating:
(Surface Preparation: Cured, clean and dry, free of surface contaminants)

One Coat	<ol style="list-style-type: none">1. Tnemec 130 Envirofil at 100 sq/ft/gal2. Ameron Amerlock 400BF at 10.0 to 20.0 mils DFT3. Benjamin Moore and Co. (Moore) "Waterborne Epoxy Block Filler" #M31/M32 at not less than 10.0 mils DFT
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One Coat	<ol style="list-style-type: none">1. Tnemec 280 Tneme- glaze at 6.0 to 8.0 mils DFT2. PPG Amercoat 2 at 4.0-8.0 mils DFT3. Moore "Polyamide Epoxy Semi-Gloss Coating" #M36/M38 at 2.0 to 3.0 mils DFT
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One Coat:	<ol style="list-style-type: none">1. Tnemec 1080 Endurashield at 3.0 to 4.0 mils DFT2. PPG Amercoat Amershield at 3.0 to 6.0 mils DFT3. Moore "Aliphatic Acrylic Urethane Gloss" P74 at 2.0 mils DFT
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2. Interior Metals, including new structural steel, existing doors and frames, Epoxy (Not specified to receive other coating systems / not shop finished):

One Coat	<ol style="list-style-type: none">1. Approved primer, in shop under other Sections (where specified). If not shop primed, provide primer recommended by finish coating manufacturer. Sand and spot prime any bare spots with primer recommended by finish coating manufacturer.
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One Coat	<ol style="list-style-type: none">1. Tnemec V27 Typoxy at 2.0 mils DFT2. Ameron Amerlock 400 at 2.0 to 4.0 mils DFT3. Moore "Alkyd Dulamel", #C207 at not less than 1.5 mils DFT
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One Coat	<ol style="list-style-type: none">1. Tnemec 29 Tufcryl at 2.0 to 3.0 mils DFT2. Ameron Amerlock 400 at 2.0 to 4.0 mils DFT3. Moore "Alkyd Dulamel", #C207 at not less than 1.5 mils DFT
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3. Interior Exposed Steel, Joists, Ductwork, Conduit and Similar Items (where indicated):

One Coat	<ol style="list-style-type: none">1. Tnemec Series 115 WB Unibond or Series 15 Unibond at 2.5 to 3 mils DFT
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2. Ameron Amercoat 220 Acrylic Series at 3.0 mils DFT
4. Mechanical and Electrical Work (Paint all exposed items throughout the project work areas except factory finished items with factory-applied baked enamel finishes which occur in mechanical rooms or areas, and excepting chrome or nickel plating, stainless steel, and aluminum other than mill finished. Paint all exposed ductwork and inner portion of all ductwork: Same as specified for other interior metals, hereinabove.

C. Pavement Markings:

1. Master Painters Institute (MPI) No. 97-2002, Latex Traffic Marking Paint, color white.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 10155

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section manufactured solid plastic, homogeneous color toilet partitions:
 - 1. Toilet partition compartments.
 - 2. Urinal screens.
- B.** Related Work: The following sections contain requirements that relate to this Section:
 - 1. Section 10801 – TOILET ACCESSORIES, for toilet accessories not included in this section, including items mounted on toilet partitions.

1.2 SUBMITTALS

- A.** Product data for materials, fabrication, and installation, including catalog cuts of materials, anchors, hardware, fastenings, and accessories.
 - 1. Include information demonstrating that products and operating hardware comply with referenced accessibility standards.
- B.** Shop Drawings: Submit shop drawings for fabrication and erection of partition assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.
- C.** Samples for initial selection purposes in form of manufacturer's color charts or chips showing full range of colors available for toilet partition panels..

1.3 QUALITY ASSURANCE

- A.** Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. Allow for adjustments within specified tolerances where taking field measurements before fabrication might delay work.
- B.** Coordination: Furnish inserts and anchorages, which must be built into other work for installation of toilet partitions and related, work; coordinate delivery with other work to avoid delay.
- C.** Accessibility Standards: Where handicap accessible toilet compartments are indicated, provide partition units and operating hardware that complies with the most restrictive provisions of the current version of following codes or standards:
 - 1. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

2. Massachusetts Architectural Access Board (MAAB).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. American Sanitary Partition Corp.
 2. General Partition Manufacturing Corp.
 3. Santana Plastic Products.
 4. Comtec/Capitol.

2.2 MATERIALS

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.
- B. Solid Plastic: High density, solid polyethylene (HDPE) resin with homogeneous color throughout. Provide material not less than 1" thick, seamless construction with edges eased.
1. Fire hazard classification: Class A flame spread/smoke developed rating, tested to ASTM E84.
- C. Pilaster Shoes and Caps: ASTM A 167, Type 302/304 stainless steel, not less than 4 inches high, 0.0396 inch thick (20 gage), finished to match hardware.
- D. Stirrup Brackets: Manufacturer's standard design for attaching panels to walls and pilasters, type 302/304 stainless steel, finished to match hardware.
- E. Hardware and Accessories: Manufacturer's standard design, heavy duty operating hardware and accessories of type 302/304 stainless steel, #4 finish.
- F. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match hardware, with theft resistant type heads and nuts. For concealed anchors, use steel that has a zinc-plated, rust resistant, protective coating.
1. Pilaster Fastening: Manufacturer's standard design for attaching pilasters to floor using concealed 13mm (1/2-inch) diameter steel expansion shields with spacer and nuts for leveling of pilaster.

2.3 FABRICATION

- A. General: Furnish standard doors, panels, screens, and pilasters fabricated from HDPE for compartment system. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition mounted hardware, accessories, and grab bars, as indicated.

1. Ease all panel edges to a radius of 1/8 inch.
 2. Fabricate doors and panels to be not less than 12 inches nor more than 15 inches above finish floor to their lowest point, and not less than 69 inches high when measured above finish floor.
- B.** Door Dimensions: Unless otherwise indicated, furnish 28 inch wide in-swinging doors for ordinary toilet stalls, and doors that provide a 32" minimum clear opening for stalls equipped for accessibility use.
- C.** Overhead Braced Compartments: Furnish stainless steel supports and anchorage devices complete with threaded rods, lock washers, and leveling bolts at pilasters as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous, extruded, aluminum, anti-grip, overhead bracing at top of each pilaster. Provide shoe at each pilaster to conceal supports and leveling mechanism.
- D.** Toilet Compartment Hardware: Furnish hardware for each toilet compartment to comply with ANSI A117.1 for handicapped accessibility and as follows:
1. Hinges: Cutout inset type, adjustable to hold door open at any angle up to 100 degrees. Provide self-closing gravity type, spring-action cam type, or concealed torsion rod type, to suit manufacturer's standards.
 2. Latch and Keeper: Manufacturer's standard surface mounted latch unit, designed for handicapped accessibility, with combination rubber faced door strike and keeper.
 3. Coat Hook: Manufacturer's standard unit, combination hook and rubber tipped bumper, sized to prevent door hitting mounted accessories.
 4. Door Pull: Manufacturer's standard unit for doors. Provide pulls on both faces of handicapped compartment doors.
- E.** Color: One of manufacturer's extended range colors, including solid, patterned, and stone colors, as selected by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A.** General: Comply with manufacturer's recommended procedures and installation sequence.
- B.** Install partitions rigid, straight, plumb, and level. Provide clearances of not more than 1/2" between pilasters and panels, and not more than 1" between panels and walls.
- C.** Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets at solid blocking and so that holes for wall anchorages occur in tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.
- D.** Screens: Attach with concealed anchoring devices, as recommended by manufacturer to suit supporting structure. Set units to provide support and to resist lateral impact.

- E. Door Stops: Provide wall-mounted door stops wherever partition door may hit wall finish. Locate stops to prevent damage to adjacent wall surface.

3.2 ADJUSTING AND CLEANING

- A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors (and entrance swing doors) to return to fully closed position.
- B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 10400

FIXED SIGNAGE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies all fixed signage as indicated on the Drawings and specified herein. The work of this section includes, but is not limited to, the fabrication and installation of the following:
 - 1. Aluminum safety signs.
 - 2. Aluminum parking signage.
- B. SIGNmaker™ software application: To be used for generating all custom sign content as digital files. No other method of creating graphic files or content is permitted.
- C. Transportation: Deliver all signs and related elements, including frames and mounting hardware, to the job site.
- D. Temporary: Provide fabrication, erection, and removal of any and all temporary safety barricades, temporary holding, retaining or storage structures necessary as described herein.
- E. Permits: Obtain permits required by Local Authorities for installation of signs.

1.2 GRAPHICS

- A. SIGNmaker™ Digital Graphics files: The Designer will prepare and supply all digital sign content using the SIGNmaker™ software application. This application will provide ½" scale elevation drawings of every sign for Contractor use in preparing shop drawings; it will also provide full size sign layouts for direct fabrication from the digitally provided files. The Contractor is responsible for verifying that each sign frame and sign panel is coordinated with the dimensions and content of supplied digital sign files; and for fabricating and installing all signs based on the Designer's supplied graphic layouts of signs, maps and associated panels.
- B. Murals and Art work panels are provided by the MBTA Design and Construction Department.

1.3 PERFORMANCE REQUIREMENTS

- A. Design Criteria:
 - 1. Design, fabricate, and install sign items to withstand normal exposure to weather, temperature variation, wind loads and building movement; provide units resistant to vandalism and theft.
 - 2. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in engineering, fabricating, and installing signs to prevent buckling, opening of joints, over stressing of components and

connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

a. Temperature Change (Range): 0 - 180 deg F ambient, material surfaces.

3. The drawings indicate minimum dimensions and thicknesses for components. Where performance requirements necessitate thickness of material to be increased or additional reinforcing to be added such revisions shall be made without changing the visible profiles of in-lay elements. Where changes cannot be made without changing visible profiles they shall be made only with approval by the Designer.

- B. Field Measurements: Check actual locations of construction – to which metal fabrications must fit – by accurate field measurements before fabrication; show recorded measurements on final shop drawings.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

- A. All submittals shall be provided to both the Designer and the MBTA for review; disposition and documentation management will be provided by the Designer.
- B. Product Data: Manufacturer's product data, any limitations and recommendations for each material used, installation instructions, and manufacturer's certification (stating that materials comply with requirements) for the Designer's review and approval.
- C. Shop Drawings: Submit shop drawings for fabrication and installation of each sign assembly, including, but not limited to: sign frames and associated sign panels drawings, plans and elevations; sign content elevation (from SIGNmaker™ 1/2"=1'-0" elevation export file); and large-scale details of each sign frame and sign panel showing all required mounting holes, slots, clips, flanges, and other integral fastener components and accessory items. Provide four copies of shop drawings for action by the Designer. After action provide two copies of shop drawings on which action has been taken to Designer for Designer's records.
- D. Sign Schedules: Submit complete Sign Schedule for each sign. Use same designations as indicated on the construction drawings.
- E. Samples for Approval: Sample Submittals are in addition to quantities shown in sign schedule. They are record project samples to be kept on file at the Designer's office.
 1. Paper Proofs: To be provided within 30 business days from the Designer's submittal of digital artwork. Fabricator proofs for:
 - a. For each Sign Assembly/Content Type listed on the signage schedules, provide half-size samples of the entire sign, and up to ten full-size proofs as determined by the Designer.
 - b. For Art and mural panels (if indicated), provide full size paper proofs; Graphic artwork provided by the MBTA.
 - c. Submit 3" x 4" samples of each color and color shape on all substrates specified for each. For Art panels provide 12" x 12" sample on specified substrate.
 2. Approval of all proofs is required from the Designer and MBTA Design Department prior to final signage production.

3. Samples and proofs will be resubmitted until they meet quality standards outlined in the next section.
4. Provide samples and proofs to the Designer at no extra charge.
5. Mock-ups: Provide up to ten full-size mock-ups in place of each type of sign for locations as determined by the Designer, to verify selections made under sample submittals and to demonstrate aesthetic effects and quality of materials and execution. Build mock-ups to comply with the specified requirements, using materials indicated for final unit of Work.
 - a. If Designer determines mockups do not comply with requirements, provide new corrected sign(s) until mockups are approved.
 - b. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 QUALITY ASSURANCE

- A. MBTA Reference Standards: Comply with the MBTA Signage Guidelines V 07.2011, and MBTA Digital Wayfinding Manual for reference to Government Center Station.
- B. Reference Standards: The work shall conform to the codes and standards of the following regulatory Agencies and Authorities as further cited herein:
 1. ADAAG: Americans with Disabilities Act Accessibility Guidelines.
 2. ANSI: American National Standards Institute.
 3. ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 as published in "Compilation of ASTM Standards in Building Codes".
 4. MAAB: Massachusetts Architectural Access Board.
- C. Source: For each type of material required for the work of this section, provide Single-Source Responsibility. For each separate type of sign required, obtain signs from a single manufacturer.
- D. Accessibility: The ADAAG and the MAAB regulations are pertinent to the design and installation of items covered under the work of this Section. When guidelines conflict, the guideline giving greater access shall be applicable.
- E. Qualifications: The approved manufacturer shall have a minimum of 5 years of successful experience with similar work, and shall have a reputation for doing satisfactory work on time.
- F. Welding Standards: Comply with applicable provisions of the American Welding Society AWS D1.1 "Structural Welding Code".
 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- G. Coating Applicator Qualifications: Must be experienced in successfully applying specified coatings of the type indicated to specified materials, and equipped with the following:
 1. Application equipment required to apply a uniform coating as recommended by the coatings manufacturer.
- H. Engineering: The Contractor is responsible for the proper engineering of all items. The internal structure, dimensions and specifications for all items shall be indicated in the Contractor's shop

drawings. Sign Contractor to engineer signs to proper level to withstand abuses of their environment.

- I. Coordination: The work in this Section shall be completely coordinated with the work of other Sections. Verify dimensions and work of other trades that adjoin materials of this Section before the installation of items herein specified. Cooperate with such trades to assure the steady progress of all work under this Contract.
- J. Project Meetings: The signage Contractor and related subcontractors shall be required to attend project meetings at the Project site when required by the Designer/Graphic Designer.
- K. Certification: Submit manufacturer's certification that materials furnished comply with requirements specified.
- L. Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of each sign installed to the MBTA, including precautions for use of cleaning materials and solvents for paint removal, which could damage surfaces.
- M. Warranty:
 - 1. Submit a written Manufacturer's warranty for MBTA acceptance, signed by the manufacturer, agreeing to repair or replace panels that fail during the specified warranty period. Failures include, but are not limited to, the following:
 - a. Coating degradation.
 - b. Chipping, chalking, fogging or discoloration.
 - c. Fading.
 - d. Structural failure.
 - e. Delamination of applied graphics.
 - f. Delaminating or degradation of applied anti-graffiti coatings.
 - 2. Warranty Period:
 - a. Aluminum – 7 years.
 - 3. The Manufacturer's warranty is in addition to, and not a limitation of, other rights the MBTA may have under the Contract Documents.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store work under this Section in a manner to prevent the cracking or stress of components, and to prevent mechanical damage or damage from the elements.
- B. Deliver work under this Section to Site in ample time to avoid delay in job progress and at such times as to permit proper coordination of the various parts.
- C. Installation of this work shall be scheduled to occur near time of Substantial Completion.
- D. Handle signs carefully to prevent breakage, surface abrasion, denting, soiling, and other defects. Comply with the manufacturer's written handling instructions for unloading components subject to damage. Inspect sign components for damage on delivery.
 - 1. Do not install damaged sign components.
 - 2. Repair minor damage to signs, provided the finished repair is equal in all respects to the original work and is approved by MBTA; otherwise, remove and replace damaged sign components.

1.7 PROJECT CONDITIONS

- A. Inspection of Site: The Contractor shall visit the site of the proposed work and become fully acquainted with existing conditions, and to become fully informed as to the facilities involved and the difficulties and restrictions attending the performance of the Contract, prior to submitting a price quotation.
- B. Substrates: Proceed with work of this Section only when substrate construction and penetration work have been completed.

PART 2 - PRODUCTS

2.1 SUPPLIED GRAPHICS

- A. SIGNmaker™ Digital Graphics files: The Designer will prepare and supply all digital sign content to the Contractor using the SIGNmaker™ software application. This application will provide 1/2" scale elevation drawings of all signs for Contractor use in preparing shop drawings; it will also provide full size sign layouts for direct fabrication from digitally provided files. The Contractor is responsible for verifying that each sign frame and sign panel is coordinated with the dimensions and content of supplied digital sign files, and for fabricating and installing all signs based on the Designer's supplied graphic layouts of signs, maps and associated panels.
- B. Formats: Digital files produced from SIGNmaker™ are exported as .EPS format for use in final fabrication of signs, and as .PNG format to facilitate 1/2" scale elevation drawings for insert into AutoCad shop drawings.
- C. Output: SIGNmaker™ produces vector graphics that do not contain editable fonts. Any typographic editing must be done by the Designer using SIGNmaker™ and re-exported to the Contractor.
- D. Colors: Match all spot colors using the Pantone Matching System (PMS) or as per file designation in the digital files and in compliance with the standard colors as identified in the MBTA Signage Guidelines. Color samples, PMS color swatches, and proofs are to be provided to the Designer at no extra charge.
- E. Mural Panels: Final digital artwork for the mural panels will be supplied by the MBTA Design Department to the Contractor. The Contractor shall be responsible for the fabrication of the artwork, adhering to industry standards of quality and procedures.
 - 1. Resolution of final sign output by fabricator must be in vector format (not raster format) with a minimum resolution of 150- 300 LPI. Final output shall match EPS digital files for accurate layout, smoothness of contours and letter forms, and evenness of colors.
 - 2. Fabricator must provide written documentation of their capabilities/specs to the MBTA to show resolution output capability of equipment - line screens (LPI).

2.2 MATERIALS

- A. Aluminum Signs:

1. Acceptable Aluminum Sign Manufacturers: Provide products from manufacturers if they meet the requirements of the specifications following.
2. Aluminum Grade: Alloy 6063-T5 aluminum sheet, 40 mil thick.
 - a. Surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner. Increase metal thickness or reinforce with concealed stiffeners or backing materials as required to produce surfaces without distortion, buckles, warp, or other surface deformations.
 - b. Unframed Single Sheet Panels: Provide unframed single sheet sign panels with edges mechanically and smoothly finished.
 - c. Aluminum panels shall be free of buckles, warps, dents, cockles, burrs, and any other defects resulting from fabrication processes.
 - d. All possible fabrication including shearing, cutting and punching of holes shall be completed prior to pretreatment of the sheeting.
3. Mounting Method: Mechanically fasten where shown unless otherwise indicated. Provide turned pins and other anchorage provisions to resist vandalism and theft.
4. Silk screening imaging: Screen printed graphics shall be produced directly from full-sized SIGNmaker™ digital files, provided to the Contractor as final approved graphics. Graphic files shall utilize digitally-prepared screens and shall be printed in accordance with accepted industry standards. No hand-cut screens will be accepted. All screen printing shall be executed in such a manner that all edges and corners of letterforms are true and clean. Letterforms, color areas, or lines with rounded positive or negative corners, built-up edges, bleeding, spattering, etc. will not be accepted. All inks shall be applied evenly without pinholes, scratches, orange peeling, etc. All silk screening processes shall be approved by the MBTA prior to fabrication.
5. Finishes:
 - a. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
 - a. The front and back surfaces of all aluminum panels shall be cleaned, deoxidized, and coated with a light, tightly adherent chromate conversion coating free of any powdery residue.
 - b. Shop finish individual components prior to mechanical assembly.
 - c. Color to match approved samples based on MBTA standard colors.
 - d. Shop Painting of Panel Faces:
 - 1) Abrasive brush blasting preparation (SSPC-SP7) to a 100-mesh sandpaper texture.
 - 2) Finish Coats: Provide intermediate and finish coats of "Imron Elite" polyurethane enamel or approved equal to achieve the colors and matte finish selected by the MBTA.

B. Hardware:

1. Supply sign hardware as indicated on the drawings.
2. Tamper resistant fasteners to be stainless steel, 3/8" dia. button head Phillips socket pinhead.
3. Threaded studs shall be low carbon mild steel with a minimum yield strength of 50,000 PSI.
4. All hardware shall be as indicated on drawings: 316 stainless steel, or galvanized per ASTM-A153 requirements.
5. Where mechanical fasteners and hardware are required, they shall be of adequate thickness, length and construction to properly secure the sign unit. Any visible portion of

any mounting device shall be finished to match adjacent sign surface, unless otherwise specified.

6. Non-metallic Washers: Provide rigid neoprene separators between fasteners and non-compatible materials being joined.

PART 3 - EXECUTION

3.1 INSPECTION

- A. The Installer shall examine substrates, supports, and conditions under which this work is to be performed, and notify the Contractor and the Architect in writing of conditions detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning work means Installer accepts substrates and conditions.
- B. Notification Point: Designer will be given 72 hour notice to perform field inspection at the start of installation of signage. If work does not meet project requirements, Contractor must remove and replace deficient work.

3.2 INSTALLATION/APPLICATION/ERECTION

- A. Strictly comply with approved shop drawings and manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this Section.
- B. Install work plumb, level, and in true plane and alignment. Provide signs and graphics where shown or scheduled using mounting methods indicated.
- C. Protect adjacent or adjoining surfaces and work from damage during installation in this Section.
- D. Work shall be designed and anchored so that work will not be distorted nor the fasteners overstressed from expansion and contraction of metal or other materials as applicable.

3.3 TOLERANCES

- A. The following installed tolerances are allowable variations from locations and dimensions indicated by the Contract Document and shall not be added to allowable tolerances indicated for other work:
 1. Allowable Variation from True Plumb, Level and Line: Plus or minus 1/32 inch from true position for signage smaller than 24 by 24 inches in size; plus or minus 1/16 inch from true position for signage 24 by 24 inches in size and larger.
 2. Allowable Variation from True Plane of Adjacent Surfaces: Plus or minus 1/16 inch.

3.4 CLEANING AND PROTECTION

- A. Adjust work to present the best possible appearance. Touch-up damaged finishes and eliminate any evidence of repair. Clean exposed surfaces using materials and methods recommended by manufacturer of material or product being cleaned. Remove and replace work that cannot be successfully repaired or cleaned.

- B. Provide temporary protection to ensure work is delivered without damage or deterioration at time of final acceptance. Remove protections and reclean as necessary immediately before final acceptance.
- C. Manufacturer shall provide the Authority with information on cleaning and maintenance recommendations for all signs.
- D. Names, stamps and decals of manufacturers, installers or maintainers of signs shall not be visible in the finished work.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 10801
TOILET ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the following items.
 - 1. Toilet accessories as scheduled on the Drawings.
- B. Items To Be Furnished Only: Furnish the following items for installation by the designated Sections:
 - 1. Section 15400 - PLUMBING SYSTEM:
 - a. Toilet accessories.
- C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 06100 - ROUGH CARPENTRY; blocking.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated on Drawings.
 - 2. Identify products using designations indicated on Drawings.
- C. Maintenance Data: For toilet accessories to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Engineer.

- B. Comply with ADA/ADAAG and MAAB requirements for accessibility.

1.4 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. A & J Washroom Accessories, Inc.
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Equipment, Inc.
 - 4. Bradley Corporation.
 - 5. General Accessory Manufacturing Co. (GAMCO).

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

2.3 GRAB BARS (TA#1)

- A. Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05 inch (18 gauge) and as follows:
 - 1. Mounting: Concealed.
 - 2. Clearance: 1 1/2 inch clearance between wall surface and inside face of bar.
 - 3. Gripping Surfaces: Manufacturer's standard non-slip texture.
 - 4. Heavy Duty Size: Outside diameter of 1 inches for Children's Toilets and 1 1/2 inches elsewhere.

2.4 TOILET TISSUE DISPENSERS (TA#2)

- A. Double Roll Dispenser: Size to accommodate two separate rolls of core type tissue to 5 inch diameter roll.
 - 1. Fabrication: Spindle-less, chrome plated, zinc alloy construction; designed for surface mounting.

2.5 MIRROR (TA#3)

- A. Materials:
 - 1. Primary Glass Standard: Provide primary safety glass that complies with ASTM C1036 requirements, including those indicated by reference to type, class, quality, and form.
 - 2. Nominal 6.0 mm (0.23 inch) thick or as recommended by glass manufacturer for application indicated, conforming to ASTM C 1036, Type I, Class 1, Quality q3, and with silvering, electro plated copper coating, and protective organic coating.
 - 3. One-piece channel frame is 1/2" x 1/2" x 1/2" stainless steel with mitered corners. Provide phillips-head frame screw to permit easy replacement of mirror.
 - 4. Provide shock-absorbing materials at mirror corners and back.

2.6 SOAP DISPENSERS (TA#4)

- A. Liquid Soap Dispenser, Wall-Mounted Type: Minimum 50 ounce capacity, 20 gage stainless steel, tank type dispenser fabricated for wall mounting. Provide vision refill window, plastic soap tank, concealed locking device, and internal parts designed to dispense soap in measured quantity by pump action and with integral check valve to prevent leaking.

2.7 COMBINATION TOWEL DISPENSER/WASTE RECEPTACLE UNITS (TA#5)

- A. Surface or Semi-recessed Unit (as indicated) with Projecting Receptacle: Stainless steel, surface-mount combination unit fabricated with continuous seamless 1 inch wide wall flange. Provide towel compartment in upper portion of unit designed to dispense not less than 600 C fold or 800 multifold paper towels, double panel door with continuous piano hinge and tumbler lock. Waste receptacle in lower portion of unit provided with reusable, heavy duty vinyl liner, minimum 18 gallon capacity, secured in place by tumbler lock.

2.8 CLOTHES HOOK (TA#6)

- A. Heavy duty satin finished stainless steel double prong robe hook; rectangular wall bracket with back plate for concealed mounting.

2.9 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to the Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Work of Section 15400 - PLUMBING SYSTEM.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 13347

PREFABRICATED WORK PLATFORMS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the following items.

1. Prefabricated work platforms of types indicated.
 - a. The basis of concept for work platforms of this contract is a prototype installed at the MBTA's Reservoir Carhouse, at the east end of the Carhouse between Tracks 5 and 6. This existing work platform demonstrates concepts, and quality of materials, finishes, products and workmanship for this project, except as otherwise indicated. Alternate means of achieving indicated System Requirements from those utilized on this existing work platform will be considered.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 15400 – PLUMBING for compressed air piping and outlets to be supplied and attached to work platforms.
2. Section 15500 – FIRE PROTECTION for sprinkler system to be supplied and attached to work platforms.
3. Section 16050 – BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK for electrical conduit and wiring, switches, and power receptacles to be supplied and attached to work platforms.
4. Section 16500 – LIGHTING for lighting fixtures to be supplied and attached to work platforms.

1.2 SYSTEM REQUIREMENTS

A. Structural Performance of Work Platforms: Provide work platforms, including stairs and railings, capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. General: All steel components shall meet the requirements of the 8th Edition of the Massachusetts State Building Code.
2. Platform Live Loads:
 - a. Platforms shall support a uniform live load of 60 psf.
 - b. Work Platforms Type A2 (at Riverside) shall support a concentrated live load of 4,000 lbs spread over ten square feet, in addition to the uniform live load.
3. Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - a. Handrails:
 - 1) Uniform load of 50 lbf/ ft. applied in any direction.

- 2) Concentrated load of 200 lbf applied in any direction.
 - 3) Uniform and concentrated loads need not be assumed to act concurrently.
 - b. Top Rails of Guards:
 - 1) Uniform load of 50 lbf/ ft. applied in any direction.
 - 2) Concentrated load of 200 lbf applied in any direction.
 - 3) Uniform and concentrated loads need not be assumed to act concurrently.
 - c. Infill of Guards:
 - 1) Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - 2) Infill load and other loads need not be assumed to act concurrently.
 - d. Toe Kicks:
 - 1) Concentrated load of 50 lbf applied in any direction.
 4. Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to $L/360$ or $1/4$ inch, whichever is less.
- B. Structural Anchorage:** Provide anchorage compatible with existing conditions and proposed sub-columns beneath concrete rail platforms.
- C. Seismic Performance:** Provide work platforms capable of withstanding the effects of earthquake motions determined according to Code. The following parameters shall be used to determine the seismic loads:
1. Building Occupancy Category: II.
 2. Site Soil Classification: D.
 3. Spectral Response Acceleration at short periods: $S_s = 0.29$.
 4. Spectral Response Acceleration at 1 second: $S_1 = 0.068$.
- D. Safety Performance:** Comply with OSHA (Occupational Safety & Health Administration) regulations.
- E. Operable Sections:** Sliding extensions shall operate easily, smoothly and without binding. In the extended position, sliding extensions shall be locked in place.
- F. Control of Corrosion:** Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- G. Coordination with Other Work:** Provide points of attachment for compressed air piping and outlets, sprinkler systems, electrical work and lighting.

1.3 SUBMITTALS

- A. Product Data:**
1. Product data for each type of finish coating required, including material data sheets and recommendations for maintenance and cleaning of coated surfaces.
- B. Shop Drawings:** Include plans, elevations, sections, details, and attachments to other work.
1. Provide templates for anchors and bolts specified for installation under other Sections.

2. Indicate methods of attachment for other work, including compressed air piping and outlets, sprinkler systems, electrical work and lighting.
3. Indicate means of operating sliding or folding extensions.

C. Erection Plans: For each work platform, indicate:

1. Preassembled units for shipping and delivery to site.
2. Means of delivery of units into Riverside Carhouse.
 - a. Comply with requirements of Section 01013 – LIMITATIONS OF WORK and Section 01568 – CONSTRUCTION SAFETY.
3. Method of attaching preassembled units together on site.
4. Means of securing incomplete work in place at the end of each work day, in accordance with Section 01013 – LIMITATIONS OF WORK.

D. Structural Calculations: For installed products indicated to comply with structural loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation.

E. Welding certificates. Qualifications for welding procedures and welders.

F. Weld inspection reports.

G. Qualification Data: For professional engineer licensed in the Commonwealth of Massachusetts.

H. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural Steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.

I. Maintenance Data: For each type of work platform to include in maintenance manuals specified in Division 1.

J. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: The manufacturer shall be an established firm with a minimum ten years of experience in the design and fabrication of custom, freestanding mezzanine systems.

B. Finisher Qualifications: Firm experienced in successfully applying shop-applied color finishes similar to that indicated for this Project.

C. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual", for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

- D. As a minimum, welds shall be visually inspected.

1.5 COORDINATION

- A. Field Measurements: Verify actual locations of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Mark out on site each connection point to existing construction.
- B. Coordinate installation of anchorages for work platforms. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store work of this Section in a manner to prevent stress, wracking, or bending of components, and to prevent mechanical damage, damage to shop-applied finishes, or damage by the elements.
- B. Shop-finished items which become rusted, marred, or damaged because of non-compliance with these conditions will be rejected, and such items shall be replaced at no additional cost to the Owner.

1.7 WARRANTIES

- A. Fabrication Warranty: Submit a written warranty, executed by the platform manufacturer, agreeing to repair or replace structural and operable components that fail within the specified warranty period.
 - 1. Warranty Period: 25 years after the date of Substantial Completion.
- B. Metal Finish Warranty: Submit a written warranty, executed by the coating manufacturer, agreeing to repair or replace finishes that fail in materials within the specified warranty period. Failures include but are not necessarily limited to deterioration of metal finishes beyond normal weathering.
 - 1. Warranty Period: 10 years after the date of Substantial Completion.
- C. Flooring Panels Warranty: Submit a written warranty, executed by the flooring panel manufacturer, agreeing to repair or replace product that fail in materials within the specified warranty period. Failures include but are not necessarily limited to manufacturing defect, delamination, finish or structural capacity.
 - 1. Warranty Period: 7 years after the date of Substantial Completion.
- D. The warranties shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
1. Prefabricated Work Platforms:
 - a. Cubic Designs Mezzanine Systems, New Berlin, WI (represented by Brodie Toyota-Lift, Shrewsbury, MA).
 - b. American Warehouse Systems, Blaine MN.
 - c. Mezzanine Built, of Panel Built, Inc., Blairsville, GA.
 - d. Grace Material Handling, Gillette, NJ.
 - e. Or approved equal.
 2. Flooring Panels:
 - a. Coated 3/4" LD ResinDek, by Cornerstone Specialty Wood Products, LLC.
 - b. I-Tech Resin Decking For Mezzanines, by Innovative Panel Technologies, Inc.
 - c. Resin Board, by Cogan Wire and Metal Products, Ltd.
 - d. Or approved equal.
 3. Fall Protection Netting:
 - a. US Netting, Inc [<http://www.usnetting.com/cargo-netting-selection-guide.html>].
 - b. Incord [www.incord.com].
 - c. Talco Specialties, Inc [www.talcospecialties.com/cargo-net.aspx].
 - d. Or approved equal.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn)
- C. Steel Deck: Type B Roof Deck, ASTM A 1008, Grade C.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M commercial steel, Type B, or ASTM A 1018/A 1018M High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F) Grade 50, unless another grade is required by design loads.

2.4 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. All structural fasteners shall be minimum 3/4" diameter SAE J429 Grade 1.

2.5 FLOORING PANELS

- A. Composition: Wood fiber, urea and melamine resins and wax emulsifier combined under heat and pressure to form panels capable of supporting specified loads; formaldehyde free.
- B. Thickness: 3/4" thick.
- C. Edge: Tongue and groove on long sides.
- D. Finish: Slip-resistant surface.

2.6 FALL PROTECTION NETTING

- A. Polyester Webbing:
 - 1. Mesh size: Three-inch square.
 - 2. Web size: One-inch wide.
 - 3. Breaking Strength: 6,000 lbs.
 - 4. Color: Orange.
- B. Carabineer Hooks:
 - 1. Material: Stainless steel.
 - 2. Breaking Strength: 6,000 lbs.
 - 3. Type: Double action.
 - 4. Anchor Style: C/1 and C/2, as defined by US Netting.

2.7 PERSONAL PROTECTIVE EQUIPMENT SYSTEM

- A. Lanyard:
 - 1. Type: Self-retracting, designed for use single user with full-body harness.
 - 2. Standards: Compliant with ANSI Z359.1, ANSI Z359.14, OSHA, and ANSI A10.32.
 - 3. Specifications:
 - a. Capacity: 75 – 310 lbs.
 - b. Maximum Arrest Force: 1350 lbs.
 - c. Maximum Arrest Distance: 24 inches.
 - d. Average Locking Speed: 4.5 feet per second.
 - e. Arc Flash Rated: ASTM F887-05.
 - 4. Lifeline Material: 0.1 x 1 inch Kevlar/Nomex webbing.
- B. Cable: 1/2 inch stainless steel, with turnbuckle ends.
- C. Cable Line Traveler: Tandem, designed to carry lanyard over cable.

2.8 MISCELLANEOUS MATERIALS

- A.** Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.9 FABRICATION, GENERAL

- A.** Comply with requirements of the American Institute of Steel Construction (AISC) "CODE OF STANDARD PRACTICE".
- B.** Provide complete work platform assemblies, including metal framing, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor platforms on supporting structure.
 - 1. Join components by welding, unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- C.** Preassembled Platforms: Assemble work platforms in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D.** Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- E.** Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F.** Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- G.** Match abutting cross-sectional configurations exactly.
- H.** Fill, grind or otherwise remove all manufacturer's identification marks.
- I.** Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - 6. Seams of hollow structural sections shall be filled and ground flush and smooth.
- J.** Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

- K. Fasten flooring panels from underneath steel floor deck, so that no fasteners are visible from above.

2.10 STEEL FRAMING

- A. Framing:
 - 1. Construct platforms and sliding extension sections of steel plate or channel headers and miscellaneous framing members as needed to comply with performance requirements.
 - 2. Fabricate stair stringers of steel plates or channels.
- B. Metal Stairs: Form risers and treads to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch.
 - 1. Steel Sheet: Uncoated hot-rolled steel sheet, unless otherwise indicated.
 - 2. Shape metal treads to include nosing integral with riser.

2.11 STEEL TUBE RAILINGS

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
- B. Form changes in direction of railings as detailed on the Drawings.
- C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- D. Close exposed ends of railing members with prefabricated end fittings.
- E. Flanges, Fittings, and Anchors: Provide end closures, flanges, miscellaneous fittings, and anchors for interconnecting components.

2.12 METAL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. High Performance Organic Coating: Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 - 1. Fluorocarbon 2 Coat Coating System: Manufacturer's standard 2 coat thermo-cured system, complying with AAMA 2605, composed of specially formulated inhibitive primer and fluorocarbon color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a total dry film thickness of not less than 1.3 mil.
 - 2. Color and Gloss: As selected by the Authority from manufacturer's standard choices for color and gloss.

3. Number of Colors: Three, as follows:
 - a. General: As selected by the Authority.
 - b. Railings, Guards and Boots: Safety yellow.
 - c. Underside of decking: Reflective white.
- C. Finish all exposed work with indicated high performance organic coating.
 1. General: Spray apply coating systems to extrusions and fabricated shapes in the thicknesses indicated, complying with manufacturer's instructions for surface preparation, application method, source quality control, and film thickness.
 2. Where fabrication of ferrous metal is required after coating application, apply touch up coating to cut edges after fabrication to restore uniform coating membrane over entire surface.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners as indicated for securing work platforms to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Placement: Set work platforms accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

3.2 ADJUSTING AND CLEANING

- A. Adjust operable sections and personal protection devices to operate properly.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 15050

BASIC MATERIALS AND METHODS FOR MECHANICAL WORK

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies general requirements and basic materials and methods for mechanical work as necessary to support the sections in Division 15 which specify particular categories of mechanical work.

1.2 SUBMITTALS

- A.** List of Materials. Within 35 days after receipt of Notice to Proceed, submit to the Engineer a list of materials and equipment proposed for use together with applicable standards compliance. Give name of manufacturer, brand name, and catalog number of each item. Submit the list complete at one time, with items arranged and identified in numerical sequence by Specification Section and Article number.
- B.** Standards Compliance
1. Where equipment or materials are specified to conform to requirements of the standards of organizations such as ASTM, ANSI, ASME, UL, ARI and ASHRAE, submit evidence of such conformance to the Engineer for record purpose.
 2. The label or listing of the specified agency will be acceptable evidence.
 3. In lieu of the label or listing, the Contractor may submit a written certificate from an approved, nationally recognized testing organization, adequately equipped and competent to perform such services, stating that the items have been tested and that the units conform to the specified standard.
- C.** Factory Test and Inspection Certification
1. Except as otherwise specified herein, factory tests and inspections for materials and equipment for which tests and inspections are specified in referenced documents, are waived, provided certified copies of test reports performed on previously manufactured identical materials or equipment are submitted to the Engineer.
 2. Test reports shall be accompanied by signed statements from the manufacturer certifying that the previously tested material or equipment is physically, mechanically, and electrically identical to that proposed for the project. Wiring and control drawings shall be included.
- D.** Shop and Working Drawings. Show complete details of the following for installation of equipment including equipment furnished by others:
1. Foundations for equipment mounting.

2. Information for setting bolts in foundations.
 3. Mounting methods, including isolation pads, showing adjustment and alignment.
 4. Pipe anchors, supports and guides.
 5. Details of installation of temporary materials and equipment to be used for the work.
 6. Layout and complete details for piping and ductwork.
 7. Plan for performing the work including the sequence of operations. Verify by field measurements and show on Working Drawings the exact location of existing utilities.
- E. Installers' Qualifications. Submit certification of qualification of workers installing mechanical equipment, as required by Article 1.02 herein.

1.3 QUALITY ASSURANCE

- A. Installation and testing of mechanical work shall be in accordance with this Specification and the instructions provided by equipment suppliers. Installers shall be qualified in accordance with the following requirements:
- B. Welders: ANSI B31.1, Power Piping.
- C. Ductworkers: Standard procedures, SMACNA Manuals. Furnish certification of qualifications by previous training and experience.
- D. Plumbers and Pipe Fitters: Licensed by the Commonwealth of Massachusetts.

1.4 CONTRACT DRAWINGS

- A. The Contract Drawings do not show all offsets, fittings and accessories that may be required. Investigate carefully the structural and finish conditions affecting the work and furnish all such fittings and accessories as may be required at no additional cost to the Authority.

1.5 ELECTRICAL REQUIREMENTS

- A. Provide electrical components of mechanical equipment and systems such as motors, motor starters and controls as specified hereinafter and as necessary for complete and operable systems.
- B. Provide motors 1 HP and larger having a high apparent efficiency for energy conservation in their normal mode of operation. Select motors for the voltage specified; extended voltage range motors will not be permitted.
- C. Provide interconnecting wiring for components of packaged equipment as an integral part of the equipment.
- D. Interconnecting power wiring and conduit for field erected equipment, and control wiring, rated over 100 volts, and all conduit, shall conform to the applicable requirements of Division 16 of these Specifications.

1.6 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Protecting Machined Surfaces. Apply a rust preventive on machined surfaces such as flanges and shafts. Use material of a type which is easily removable with solvent during equipment installation.
- B. Covering Openings. Close pipe connections and other openings with easily removable plugs, stoppers or flange covers.

1.7 VERIFICATION OF DIMENSIONS

- A. Visit the premises and thoroughly check details of work and working conditions, verify all dimensions in the field, and advise the Engineer of any discrepancy before ordering material and equipment or performing work. The Contractor shall be responsible for the coordination and proper relation of his work to the structure and to the work of all trades.

1.8 PIPE IDENTIFICATION

- A. Provide color-coded pipe identification markers on piping installed under this section. Pipe markers shall be snap-on laminated plastic protected by clear acrylic coating. Pipe markers shall be applied after architectural painting where such is required.
- B. Provide arrow marker with each pipe content marker to indicate direction of flow. If flow can be in either direction, use double-headed arrow marker.
- C. All piping shall be labeled at points of entrance and exit from all Sprinkler and Mechanical Rooms, adjacent to each valve, on each riser, at each tee fitting, at points of entrance and exit from building, at least once in each room, at each fixture and/or each fixture group within a room, and at intervals no longer than 20 feet above finished ceiling or below, where exposed.
- D. In general, 2" high legend shall be used for pipe lines 4" diameter and larger and 3/4" high legend shall be used for pipe lines 3" diameter and smaller.
- E. Markers shall be "Setmark" by Seton Name Plate Corp., or approved equal.
- F. Color banding shall meet ANSI A13.1-1975 and OSHA.
- G. Color coding shall be used with names in black letters on background as indicated herein:

<u>Service</u>	<u>Legend</u>	<u>Background Color</u>
Cold Water	Cold Water	Green
Hot Water	Hot Water	Yellow
Compressed air	Compressed air	Green

1.9 TAGS

- A. Upon completion of work, attach stamped, brass, black-filled tags to all valves. Tags shall be 19-gage, 1-1/2" diameter with numerals at least 1/2" high, and attached by "S" hooks or chains. A framed "Valve Chart" shall accompany such work and be mounted in Mechanical Room.

PART 2 – PRODUCTS

2.1 STANDARD PIPE AND FITTING CLASSES

- A. General: Service applications for following classes of pipe and fittings are specified in other sections of these Specifications, and may be indicated on the Contract Drawings. Where more than one class is indicated, either class may be used, but the classes shall not be intermingled.
- B. Class A
1. Pipe and Fittings: ANSI/ASTM A 74, service weight, cast iron soil pipe and fittings.
 2. Joints: packed oakum and molten lead; CISPI installation standards for caulked service weight soil pipe joints.
- C. Class B
1. Pipe and Fittings: ANSI/ASTM A74, service weight, hub and plain end cast iron soil pipe and fittings.
 2. Joints: Neoprene gasketed compression type; CISPI HSN.
- D. Class C
1. Pipe and Fittings: ANSI/ASTM A74, extra heavy weight, bell and spigot cast iron soil pipe and fittings.
 2. Joints: Lead and oakum; CISPI installation standards for caulked extra heavy weight soil pipe joints.
- E. Class D
1. Pipe and Fittings: ANSI/ASTM A74, extra heavy weight hub and plain end cast iron soil pipe and fittings.
 2. Joints: Neoprene gasketed compression type; CISPI HSN.
- F. Class E
1. Pipe and Fittings: Service weight plain end cast iron soil pipe and fittings; CISPI 301.
 2. Joints: Neoprene gaskets with corrosion-resistant clamps and bolts; CISPI 301.
- G. Class F
1. Pipe: ANSI A40.5, cast iron threaded pipe.
 2. Fittings: ANSI B16.12, cast iron recessed drainage type threaded fittings.
 3. Joints: Threaded and coupled joints, ANSI B2.1.
- H. Class G

1. Pipe: ANSI 21.51/AWWA C151, ductile iron pipe, thickness class as indicated, coated outside with bituminous coating and lined with cement mortar, thickness set by Table 51.2 of AWWA C151.
2. Fittings: ANSI A21.10.
3. Joints: Mechanical flanged joints with neoprene gaskets. Flanges to ANSI A21.11/AWWA C111, cast iron, flat face.

I. Class H

1. Pipe: Polyvinyl Chloride (PVC) ASTM D2665, Schedule 80, Type I, Grade 1.
2. Fittings: Socket weld, same material and schedule as pipe.
3. Joints: Socket welded with PVC solvent cement, ASTM D2564.

J. Class I: (Not used)

K. Class J

1. Pipe: ASTM B306, Type DWV, hard copper drainage tube.
2. Fittings: ANSI B16.23, wrought copper or bronze solder-joint drainage fittings.
3. Joints: Soldered.

L. Class K

1. Pipe: ASTM B88, Type L, hard copper tubing.
2. Fittings: ANSI B16.18 cast bronze solder fittings, or ANSI B16.22 wrought copper solder fittings and couplings.
3. Joints: Silver-brazed.

M. Class L

1. Pipe: ASTM B88, Type L, hard copper tubing.
2. Fittings: ANSI B16.18 cast bronze solder fittings, or ANSI B16.22 wrought copper solder fitting and couplings.
3. Joints: Silver brazed.

N. Class M

1. Pipe: ASTM B280, seamless copper tube, hard drawn.
2. Fittings: ANSI B16.18 cast bronze solder fittings, or ANSI B16.22 wrought copper solder fittings and couplings.

3. Joints: Silver brazed.

O. Class N: (Not used)

P. Class O: (Not used)

Q. Class P

1. Pipe 2 Inches and Smaller: ASTM A120, Schedule 40, black steel, beveled ends for welding.
2. Pipe 2-1/2 Inches and Larger: ASTM A135, Grade A or A139, Grade B, as indicated, Schedule 40, black steel, beveled ends for welding.
3. Fittings 2 Inches and Smaller: ASTM A105, Grade II, and ANSI B16.11, 2000 pound forged steel socket weld fittings.
4. Fittings 2-1/2 Inches and Larger: ASTM A234, and ANSI B16.9 standard weight butt welding fittings.
5. Joints 2 Inches and Smaller: Socket weld.
6. Joints 2-1/2 Inches and Larger: But weld.
7. Unions 2 Inches and Smaller: ANSI B16.3, malleable iron threaded.
8. Unions 2-1/2 inches and Larger: Flanged.
9. Flanges: ANSI B16.5 and ASTM A181, Grade I, forged steel, raised or insert face, 150-pound class, slip-on or welding neck to suit field conditions.

R. Class R

1. Pipe 2 Inches and smaller: ASTM A120 seamless, schedule 80, galvanized, threaded.
2. Pipe 2-1/2 Inches and Larger: ASTM A135 or A139, Grade A or B, black steel, beveled ends for welding.
3. Fittings 2 Inches and Smaller: ANSI B16.3, galvanized, malleable iron, threaded.
4. Fittings 2-1/2 inches and Larger: ANSI B16.9 and ASTM A234, extra heavy butt welding fittings.
5. Joints 2 Inches and Smaller: Galvanized, threaded and coupled.
6. Joints 2-1/2 inches and Larger: But weld.
7. Unions 2 inches and smaller; ANSI B16.3, malleable iron, galvanized, threaded.
8. Unions 2-1/2 inches and larger: Flanged.

9. Flanges: ANSI B16.5 and ASTM A181, Grade I, forged steel, raised or insert face, 150-pound class, slip-on or welding neck to suit field conditions.

S. Class S

1. Pipe: ASTM A120, or ANSI B36.10, Schedule 80, black steel, screwed, flanged or welded ends.
2. Fittings
 - a. FS WW-P-501, Type and Class of fittings to match adjacent piping.
 - b. FW WW-P-521, to match adjacent piping, per NFPA standards.
3. Joints
 - a. 4 inches and larger: Butt weld in tunnels and where indicated.
 - b. Under 4 inches: Threaded type except butt flanged where indicated, as required by NFPA standards.
4. Unions
 - a. 2 inches and smaller: ANSI B16.3, malleable iron, threaded.
 - b. 2-1/2 inches and larger: Flanged.
5. Flanges: ANSI B16.5 and ASTM A181, Grade I, forged steel, raised or plain faced 300-pound class.

T. Class T

1. Pipe: A 120, Schedule 40, black.
2. Fittings: ANSI B16.3, 150 pound, black.

U. Class U: Same as Class T except galvanized.

2.2 BRANCH TEES

- A. Refrigeration Piping: Wrought copper, Schedule 80, soldered.
- B. Welded Pipe (all): Welding or brazing outlets with branch size at least 2 sizes smaller than the main.
- C. Copper Tubing: Brazing outlets, with branch size at least 2 sizes smaller than the main.
- D. Match Schedule 40 or with appropriate outlets as required to match piping.
- E. Forged, as indicated.

2.3 PIPE JOINT MATERIAL

- A. Silver Brazing Alloy: AWS requirements, Class BC UP-5 for 1100 to 1500 degrees F melting temperature.
- B. Solder: ASTM B32, Grade 95 TA, up to 250 degrees F.

- C. Arc-Welding Electrodes: ASTM A 233, or as indicated.
- D. Welding-Rods for Oxyacetylene Welding; AWS A5.2, ASTM A 251.

2.4 PIPE HANGERS AND SUPPORTS

- A. FS WW-H-171, standard commercial product with the type as required for each particular application.
- B. Anchors: FS FF-S-325, fastened as indicated.

2.5 VALVES

- A. Backwater Valves, Flap Type: Cast-iron, ASTM A74, individual assembly, hinged or pivoted, with bronze rotating disc and seat.
- B. Backwater Valves, Combination Type: Cast-iron, ASTM A74, Combination floor drain with P-trap flap type assembly, hinged or pivoted, with rotating disc.
- C. Gate Valves
 - 1. 2 Inches and Smaller: 150 pound bronze, non-rising stem, wedge disc, threaded connection; FS WW-V-54, Type I, Class B.
 - 2. 2-1/2 Inches and Larger: 125 pound, iron body, non-rising stem, wedge disc, flanged connection; FS WW-V-58, Type I, Class I.
- D. Globe and Angle Valves
 - 1. General: FS WW-V-51, Type I or II, Class A or B.
 - 2. 2 Inches and Smaller: 150 pound, bronze, replaceable seat and disc, threaded connection.
 - 3. 2-1/2 Inches and Larger: 125 pound, iron body, bronze trimmed, replaceable seat and disc, bolted yoke bonnet, two-piece packing gland, flanged connection.
- E. Check Valves
 - 1. General: FS WW-V-51, Type IV, Class A or B, or as indicted.
 - 2. Swing Check, 2 Inches and Smaller: 150 pound, bronze threaded connection, with removable hinge pin and screwed cap, suitable for operation in either horizontal or vertical position.
 - 3. Swing Check, 2-1/2 inches and larger: 125 pound, flanged connection, with removable hinge pin and bolted cap.
 - 4. Silent Check: Globe type, 150 pound, iron body, with disc guided top and bottom, bronze trimmed seat and plug, stainless steel spring, flanged connection.
- F. Butterfly Valves

1. General: FS WW-V-1967, Type A or B, as indicated. Butterfly valves shall consist essentially of a body, disc assembly, stem, stem packing, removable packing retainer, operating lever, and appropriate end connections.
2. Seats: Type A valves shall be suitable for Class 175 for water, oil or gas (WOG) at any temperature in the range minus 20°F to 125°F; Type B, for Class 175 and any temperature from minus 30 degrees F to 350 degrees F.
3. Discs: Stainless steel. Materials which are of dissimilar metal with respect to the galvanic scale shall be separated from the valve body by an insulating material which prevents electrolytic corrosion.
4. Shaft Stems: Stainless steel, ASTM A 582, Type 304 or 316.
5. Control Handles: Suitable for locking in any position, or with 10 degree or 15 degree notched throttling plates to hold valve in selected position.
6. Valves in insulated lines: Provide extended necks to compensate for insulation thickness and allow ample clearance for operating handle.

G. Ball Valves

1. Lever-operated, 175 pound, non-lubricated eccentric plug type, with nickel-iron body, suitable for service with water at 250 degrees F. Provide with full round port and balanced plug coated with appropriate material for low torque and bubble-tight shut-off. Provide with position indicator on cap or side of body.

H. Compression Stops

1. Exposed Water Supplies to Fixtures: Polished, chrome-plated, loose key brass stop.
2. Concealed Supplies to Fixtures: Long-neck, built-in, loose key, with flange, for required wall thickness with exposed parts chrome plated.
3. Exposed Supplies at Hose Faucets: 125 pound, brass or cast iron body, brass plug, square head cock.

- I. Air Vent Valves, Automatic:** Float-type, with ball check discharge port threaded for 1/8 inch IPS drain connection, copper, clad steel float with stainless steel float pin, threaded and gasketed removable float housing, and cast brass base threaded for 3/4 inch male IPS connection.

- J. Pressure Reducing Valves:** All bronze construction, spring loaded, single seated, suitable for tight shut-off under dead-end conditions. Provide with renewable composition seat discs, nylon inserted diaphragm, bolted spring changer, and threaded connection.

K. Relief Valves:

1. General: Pressure and temperature relief for hot water supply systems, MIL-V-13612.
2. ASME rated for intended service: Single-seated, bronze body and trim, guides, adjusting screw with cap and threaded connections.

3. Hydraulic valves.
4. As required for the system indicated.

L. Hose Faucets: Brass, 1/2 inch male, inlet threads, 3/4 inch, hose connection, hexagonal shoulder.

2.6 UNIONS

- A. Black Steel Pipe, 2 Inches and Smaller: FS WW-U-531, uncoated malleable iron or steel with brass or bronze seats, 150 pound, threaded.
- B. Galvanized Steel Pipe, 2 Inches and Smaller: Galvanized with brass or bronze seats, 150 pound, malleable iron, threaded.
- C. Copper or Brass Pipe or Tubing, 3/8 Inch and Smaller: 150 pound, cast bronze or copper, ground joint, nonferrous seat, with solder ends. Compression fittings for air service.
- D. Copper or Brass Pipe, 1/2 Inch to 2 Inches: Cast brass, 150 pound, ground joint, brass-to-brass seat, with threaded ends.
- E. Black and Nickel-Copper Alloy Steel Pipe, 2-1/2 Inches and Larger: Forged steel, 150 pound, raised face, slip-on or welding neck to suit field fit up.

2.7 FLANGES

- A. Ductile Iron Pipes: ANSI A21.11, 250 pound, flat face, cast iron flanges for mechanical joints. ASTM A 307, Grade B, bolts and nuts. Bolts: Regular square head unfinished. Nuts: Heavy semi-finished hexagon nuts conforming to ASTM A 194, Grade 2H.
- B. Welded Steel Pipe: ASTM A181, Grade I, 150 pound black forged steel welding flange, with 1/16 inch raised face. Use flat face when connected to flat-faced companion flange; slip-on to suite field conditions.
- C. Copper, Bronze, or Brass Pipe: ANSI B16.24, 150 pound, cast bronze, flat-faced with solder ends, 1/2 to 12 inches.

2.8 GASKETS

- A. Cold Water Service: MIL-G-13210, rubber, 1/16 inch thick.
- B. Hot Water Service: Compressed aramid, 1/16 inch thick.
- C. Soil, Waste, Vent and Drain: Neoprene rubber as required for type of pipes used, ASTM C 508, cellular elastomeric preformed gasket, and sealing material, ASTM C 364.

2.9 INSULATING CONNECTIONS

- A. Provide insulating flanges or unions suitable for 125 pound working pressure and for services as required, constructed so that connected pipes are completely insulating from each other without metal to metal contact. Provide with metal connections at ends, threaded or soldered to match adjacent piping.

- B. Insulating couplings will not be acceptable.

2.10 EXPANSION JOINTS

- A. Pressure Rating: One hundred fifty psi minimum at 250 degrees F.
- B. Type: Flanged, stainless steel, consisting of a corrugated bellows, capable of absorbing pipe movement in an axial or lateral direction. Provide with support rods to keep flange faces parallel during installation.
- C. Pipe-alignment Guides: As recommended by the joint manufacturer but in any case not more than five feet on each side of each expansion joint, except in lines four inches or smaller they may be not over two feet each side of the joint.
- D. Traverse Capacity of Joint: Not less than indicated.

2.11 ESCUTCHEONS

- A. Finished Areas: Chromium plated, pressed or stamped brass, one piece, or split pattern, held in place by internal-spring or set screw.
- B. Unfinished Areas: Galvanized metal disc or plates.

2.12 PIPE SLEEVES

- A. Pipe Sleeves Through Interior Walls and Floors:
 - 1. Clay: ASTM C4, Class as indicated.
 - 2. Concrete: ASTM C14, non-reinforced, type as indicated.
 - 3. Steel: ASTM A120 (1/8 thru 16 inches), A 53 (18 through 24 inches), or ANSI B36.10.
- B. Pipe Sleeves Through Exterior Walls With Waterproofing or Damp Proofing: Cast iron, ASTM A74, pressure sealing with membrane clamp; cast body with external fins, internal pressure rings and grommet, pressure clamp with stainless steel bolts; oversize steel sleeve with neoprene sealing rings.

2.13 STRAINERS

- A. Strainers: MIL-S-16293, Class 125, Style Y, Type I or III.

2.14 PROTECTIVE COATING FOR PIPE

- A. Tape: Polyvinyl chloride or polyethylene pressure sensitive tape, nominal 20 mils thick, conforming to the following requirements:
 - 1. Maximum Moisture Transmission Rate; 1.8 grams/100 square inch/24 hours.
 - 2. Maximum Moisture Absorption; 0.57 percent.
 - 3. Maximum Continuous Service Temperature; 175 degrees F.

4. Minimum Dielectric Strength; 20,000 volts.

5. Minimum Insulation Resistance; 500,000 megohms.

B. Two separate layers of 10 mil tape may be used for piping, except do not use single tape with half lap. Use same tape in 10-mil thickness for field joints and fittings.

C. Mark pipe wrapping to indicate manufacturer, number, and thickness.

D. Primers: Type specifically compounded for tape being used.

2.15 GAGES

A. Gages: FS GG-G-76, sizes as indicated.

B. Calibration: Calibrated to two percent in middle 1/3 of dial range and equipped with means of front calibration.

C. Movements: Phosphor bronze bushed, rotary type.

D. Panel Mounted: Flush mounting type in cast iron or aluminum cases.

E. Stem or Pipe Mounted: Flangeless cases of drawn or stamped steel, phenolic or aluminum.

2.16 THERMOMETERS

A. General: Red reading mercury column type with wide angle of vision and high magnification of mercury column, or heavy, one-piece, extruded or cast brass or aluminum construction with glass front. Thermometer scales: maximum two degree between graduation and 20 degree between figures. Provided steel bulb chambers and brass separable sockets.

B. Scale Lengths: Seven inches minimum for tanks and similar equipment, and five inches minimum for piping.

C. Optional: Dial thermometer with five-inch dials and liquid-filled thermal systems.

2.17 ACCESS PANELS

A. General: This Article applies to prefabricated wall and ceiling panels for service access to equipment. For doors and access panels in sheet metal ductwork and plenums, see Section 15800 - AIR DISTRIBUTION.

B. Size: Large enough to permit removal of equipment and in no case less than 12 by 12 inches net opening. Where entrance of serviceman is required, provide minimum opening of 12 by 24 inches.

C. Construction:

1. In Ceilings:

- a. Fire Rated: UL listed for minimum one hour rating, with concealed hinge and screwdriver-operated cam latch. Construction at least equal to that listed in Subparagraph 1.b below.
 - b. All Other: Doors, 16 USS gauge minimum; frames, 18 USS gauge minimum, with concealed hinge and screwdriver-operated cam latch.
 - c. Finish: Factory prime coat.
2. In Toilet Rooms and Ceramic Tile Walls: Construction same as Subparagraph 1.b above, with polished stainless steel face.

2.18 ELECTRIC MOTORS

- A. General: Provide motors so that load on driven equipment will not exceed motor rated capacity under most severe conditions to be encountered; single phase motors up to 1/2 HP, all others three phase.
- B. Standards: Latest editions of applicable standards of NEMA, IEEE and ANSI.
- C. Voltage: As indicated.
- D. Enclosures:
 1. Indoor Use: Drip-proof with drain plugs or other openings for condensate drainage.
 2. Outdoor Use: Totally enclosed, non-ventilated, or fan-cooled type.
- E. Motor Types:
 1. Polyphase: NEMA Design B, squirrel cage, normal starting torque, low slip, with antifriction ball-bearings.
 2. Single Phase: Capacitor-start, induction-run, with ball bearings or sleeve bearings.
- F. Service Factor:
 1. Drip-Proof Motors; 1.15.
 2. Totally Enclosed; 1.0.
- G. Insulation:
 1. Class B, except as indicted.
 2. Open Drip-Proof Motors: Insulation system completely sealed and coated with abrasion resistant material such as polyurethane. Provide corrosion treatment on rotors, stators, end shields and air deflectors.

2.19 VIBRATION ISOLATORS

- A. General

1. Isolate mechanical equipment and associated piping and ducting as required to minimize transmission of vibration and structure-borne noise to structure or spaces.
2. Select and install isolation in accordance with the isolator manufacturer's instructions. Submit for review and approval before installation, isolator selection calculations and details.
3. Furnish services of a trained manufacturer's representative to inspect the completed installation.

B. Spring Isolators

1. Isolators: Freestanding, laterally stable and complete with neoprene pads as specified herein. Provide springs with coil outside diameter not less than 0.8 of the coil operating height. Springs shall have an additional travel to solid equal to 50 percent of design static deflection. Yield stress of spring material shall not be exceeded when the spring is fully compressed.
2. Top and Bottom Spring Support Plates: Welded to spring and dimensioned to prevent any visible deflection when loaded. Size bottom plate for proper loading of neoprene pad and provide in square configuration.
3. Spring Isolator Assembly: Provide a minimum of three height adjustment bolts, a precompression bolt and vertical restraint bolts. Furnish spring isolators precompressed to facilitate installation. Vertical restraint and precompression bolts shall be out of contact with the isolator during normal operations.
4. Spring Isolator Coating: Galvanized or neoprene coated where installed exposed to weather.
5. Static Deflection: As indicated or as required in these Specifications.

- C. Neoprene Isolating Pads:** Neoprene, 40A durometer hardness, 1/2 inch thick, permanently bonded to the underside of the bottom spring isolator plates. Dimension for uniform loading not to exceed 50 psi.

PART 3 – EXECUTION

3.1 GENERAL

A. Protection of the Work

1. Cover openings in ductwork, conduits and piping and temporarily seal to protect from contamination.
2. Protect materials and equipment from damage due to environmental conditions. Use protective cover, and protect from surface water by using raised platforms.
3. Protect unfinished work at the end of each day from damage, contamination, and moisture, by the use of plugs, caps, or covers.

4. Do not lay pipe on a foundation into which frost has penetrated, nor at any time when the Engineer determines there is danger of ice formation or frost penetration at the bottom of the excavation.
5. Protect piping and valves from damage pending performance of system tests.
6. Protect installed thermometers and gauges from accidental damage by construction activity.
7. Following installation, and prior to final embedment, use temporary protective covers and fixtures to prevent damage from all traffic and overburden loads which would damage or displace embedments.
8. Clean fixtures, piping, valves, finished brass, and equipment installed under this work. Drain and flush piping to remove grease and foreign matter. Flush air and gas piping with compressed dry nitrogen.

B. Location of Fixtures and Equipment

1. The mechanical sheets of the Contract Drawings are diagrammatical and not intended for use in determining the exact locations of the components of mechanical and electrical systems.
2. Refer to applicable sheets of the Contract Drawings to determine the exact location of fixtures and equipment to be installed under the Contract as well as the location of items indicated on the Contract Drawings to be installed by others.

3.2 INSTALLATION OF PIPING

A. General

1. Install piping parallel to walls where possible and desirable. Clear all obstructions, preserve headroom and keep openings and passageways clear.
2. Should structural difficulties or other work prevent running of pipes or setting of equipment at locations indicated, necessary minor deviations therefrom will be allowed, as approved by the Engineer.
3. Run piping in chases or recesses in walls where provided, through openings in floors, and in furred ceilings; otherwise, as exposed pipes. Do not embed piping in or below structure, except as indicated.
4. Expanding or swaging of tubing to fit IPS fitting sockets will not be permitted.
5. Use reducing fittings where change in pipe size occurs.
6. Use couplings only where required pipe runs between fittings are longer than standard length of pipe being used.
7. Make exposed polished or enameled connections to fixtures or equipment with special care to avoid damage to finished surfaces.

8. Make changes in direction only with fittings.
9. Provide expansion loops (bends) where indicated to allow for proper pipe expansion. Construct bends with long radius welding fittings unless otherwise indicated.
10. Use proper length bolts for each size flange on flanged connections. Bolts with excessive length of exposed threads will not be permitted. A minimum of three full threads is required to be exposed beyond the nut after tightening the assembly.
11. Prevent entry of foreign matter during handling, assembling and installation. Use compressed air, wire brush, solvent and other acceptable means to remove residual scale, dirt and other foreign matter from interior of piping before final connections are made. Protect open ends of pipe by capping, plugging or other acceptable means.
12. Anchor piping subject to expansion or contraction in a manner permitting strains to be evenly distributed and alleviated by swing joints or expansion loops.
13. Flush out and blow out piping systems as specified under "Protection, Care and Cleaning".
14. Ream pipe ends to remove burrs.
15. Install all piping with sufficient pitch to insure adequate drainage and venting.
16. Provide unions or flanges in piping connections to equipment.
17. Electrically isolate connections between ferrous piping and piping with dielectric couplings or fittings.
18. Install class of piping as indicated.
19. Do not run water piping over electric switchboards, transformers, or electric motor starters.
20. Protect against external corrosion pipes which pass through, under, or otherwise in contact with soil, cinders, concrete, or other corrosive material. Protect by protective wrappings, as specified, or by other means approved by the Engineer.

B. Sewer, Waste and Storm Drain Piping

1. Run horizontal drainage piping as straight as practicable, and at a uniform pitch.
2. Install pipe 3 inches or less in diameter with a pitch of not less than 1/4 inch per foot.
3. Install pipe larger than 3-inch diameter with a pitch of not less than 1/8 inch per foot.
4. Install storm or sanitary sewers within or adjacent to any building or structure at a slope which will produce a computed velocity of not less than 2 feet per second.

C. Compressed Air Piping: Pitch piping away from receiver to a low point or to a dead end; provide drips and traps with valves shut-off at all points. Make branch connections at top of main.

3.3 INSTALLATION OF PIPE JOINTS AND CONNECTIONS

A. General

1. Cut pipe with appropriate tool; debur. Make joints tight. Test and remake leaky joints with new materials. Do not use thread cement or caulking to remake joints. Do not use a sharp-toothed wrench in making up brass pipe, or chrome plated items.
2. Thread forms and length shall be in accordance with ANSI standards. Use a lubricant or sealant on male threads suitable for the proposed pipe service.
3. Clean joint before soldering, use an appropriate flux and alloy for operating temperature level as indicated.
4. Install solvent-cement joints for PVC pipe in accordance with manufacturer's recommendations.
5. Apply the standard rules for the welding of pipe joints as contained in the ANSI Standard Code for pressure piping: including welding procedures, qualification of welders, and testing. Follow applicable local safety codes.
6. Provide a gasket coated with the recommended lubricant between the contact faces of the flanges.

B. Cast Iron Soil Pipe

1. Bell and Spigot Pipe. Make joints with caulking lead and gasket of packed oakum or dry jute. Use joint runner so lead will finish flush with bell. Caulk the joints tight, leaving not less than one inch of lead in bells. Run every joint full at one pouring.
2. Neoprene Gasketed Plain Spigot End Pipe. Insert gaskets, lubricate inside of gaskets and outside of pipe, and join together with suitable tool, as recommended by manufacturer.
3. Hubless Pipe: Assemble in accordance with Massachusetts Plumbing Code.

C. Copper Tubing Systems

1. Use silver brazed joints for refrigerant piping. Flow nitrogen through tubing to prevent oxidation during brazing.
2. For all other service, make joints with 95-5 tin antimony or (up to 250 degrees F.) 50-50 tin-lead solder.
3. Clean outside of tube and inside of fitting at point of contact before joining. Take care to prevent overheating of tube and fitting before joining. Before silver brazing, disassemble solder type valves used in refrigerant piping, and keep valve bodies cool by use of damp cloths or other approved methods.

D. Ductile Iron Mechanical Joint Water Pipe: ANSI A21.11

1. Outside Coating: Bituminous coating approximately 1 mil thick, with finished coating continuous, smooth, neither brittle when cold nor sticky when exposed to the sun and strongly adherent to the pipe.
2. Cement-Mortar Linings: ANSI A21.4.
3. Inside Coating: Unless otherwise specified, provide inside coating for pipe that is not cement-lined of bituminous material, at least 1 mil thick, which conforms to appropriate requirements for seal coat.

E. Drain Connections

1. Make all threaded joints with graphite or inert filler and oil, or of approved graphite compound, or with polytetrafluorethylene tape applied to male threads only.
2. Caulked joint as for bell and spigot pipe.

F. Steel Pipe and Welding Fittings. Make joints in welded piping by oxyacetylene or electric arc process with welding continuous around pipe. Welders shall be qualified per ANSI B31.1.

G. Polyvinyl Chloride Pipe

1. Threaded Joints. Make joints with teflon pipe joint compound, or teflon tape of type recommended by pipe and fitting manufacturer, suitable for service in which it is to be used, conforming to ANSI B2.1.
2. Flanged Joints. When required, flanged joints may be used to connect to equipment or to other piping materials. Flanged, socket typed molded PVC heavy 150-pound pattern, drilled per ANSI 16.5.
3. Welded Joints. Use solvent cement of type recommended by fitting manufacturer, suitable for service in which it is to be used. Joints shall be made by workmen skilled in technique of welding PVC pipe.

3.4 INSTALLATION OF PIPE SLEEVES

A. General

1. Provide a pipe sleeve where each pipe passes through a wall or floor and at other locations indicated. Sleeves through floor should project 1/2 inch above the finished floor.
2. Provide minimum of 1/2 inch radial clearance beyond pipe and pipe plus insulation, where required. Extend sleeve the full thickness of wall or floor. For high temperature, follow clearance requirements of NFPA.
3. Secure sleeves to concrete forms to prevent displacement during placing of concrete.
4. Where pipes pass through fire-rated walls, or floors, place a fire seal of aramid rope or similar non-combustible material between pipe and pipe sleeve for the full length of the sleeve to maintain fire rating.

B. Location and Types

1. At interior walls and floors provide permanent sleeves of clay pipe, concrete pipe, or steel pipe. Where sleeves cannot be installed such as connections to floor drains, pipes shall not be in contact with reinforcing steel. Caulk space between pipes and pipe sleeves with oakum and mastic and made watertight.
2. At exterior walls with waterproofing or dampproofing as specified herein, provide permanent sleeves of cast iron.
3. Clamp membrane into place and caulk with oakum and mastic in the caulking recess. At walls more than 15 feet below grade, provide a compression seal as indicated.

3.5 INSTALLATION OF PIPE HANGERS AND SUPPORTS

A. General

1. Provide above ground piping systems inside and outside building with anchorages, sway braces, guides and supports as required by applicable portions of ANSI B31 except as otherwise indicated.
2. Provide pipe supports as indicated. The necessary hangers and supports, including beam and purlin clamps, rods, pipe rolls, angles, channels and plates, as well as any changes from indicated design, shall have the Engineer's prior approval.
3. Use of building structural steel for supporting hangers will be permitted only where indicated or approved by the Engineer. Do not weld transversely across the tension flange of any member under stress; use bracing, girts, and other secondary members for support; or burn or drill holes in building steel.
4. Support vertical piping with approved steel brackets to prevent swaying, sagging, vibration and resonance; however, allow for thermal expansion between supports or anchors. Do not use flat steel strap hangers.
5. Do not support piping by wire, rope, strap, chain, wood or similar devices.
6. Provide pipe hangers of same size, or nearest commercial size available, as pipe or tubing on which they are to be used. Allow for thickness of insulation in sizing hangers.
7. Mount hose faucets, compressed air outlets, and similar items with short cantilevers at ends of pipe branches.
8. Supporting structures, including supporting frames, anchors and guides common to mechanical work and electrical work may be used unless specifically otherwise indicated.
9. When piping to equipment mounted on vibration isolators provide spring cushion or other approved type isolation hanger on the pipe support nearest, and on each side of, the equipment.

10. Except as otherwise noted, use adjustable iron hangers for 1-1/4 inch and smaller pipe, and clevis type for 1-1/2 inch and larger pipe. Where copper tubing is directly supported, use copper plated hangers.
11. Anchors for pipe hangers and supports:
 - a. Cast-in-place weld plates as indicated.
 - b. Anchor bolts placed in drilled holes with high strength cement grout. Dimensions and material as indicated.
 - c. Expansion bolts, FS FF-S-325, set in drilled holes. Follow manufacturer's instructions for insertion and bolt anchoring. Dimensions as indicated; however, bolt embedment at least four times bolt diameter.

B. Supports for Insulated Piping

1. For insulated hot and cold lines, unless otherwise indicated, use pipe saddles welded to pipe lines as required for supporting piping from exterior of insulation. At time of installation, fill with insulating cement.
2. In lieu of saddles, pipe two inches and smaller may be supported from insulation with galvanized steel half round protective shields.
3. For vertical piping four inches and larger, provide angle or plate type insulation supports welded to pipe at approximately 12-foot intervals. Fabricate these supports of same material as pipe to which they are attached, and of widths less than thickness of insulation covering.
4. Install hangers around outside of low temperature insulation. Insert section of nine inch long by 180 degree cellular glass, minimum eight pounds per cubic foot density, with vapor barrier jacket plus 18-gage by 10 inch by 180 degree galvanized steel shield. Special hangers equipped with equivalent insulating material and vapor barrier may be used.

3.6 VALVES AND VALVE BOXES

- A. General. Provide valves at all points shown and specified, arranged to give complete and regulating control of piping systems. Provide valves full size of line in which installed, unless otherwise indicated. Install valves with neat appearance and grouping, so parts are easily accessible for operation and maintenance. These are used in low temperature service with copper pipe. Install throttling flow valves where indicated, and on each circulating return branch on domestic hot water systems on hot water heating systems and on a chilled water system.
- B. Compression Stops. Install stop valve or compression stop on water supply lines to each plumbing fixture, including faucets and showers. Where required for accessibility, install them exposed adjacent to faucets. Where fixture trim is specified with integral built-in stops, individual supply stops will not be required. Unions are not required adjacent to compression stops.
- C. Air Vent Valves

1. Manual Air Vent Assemblies. Provide in hot water heating and chilled water cooling systems where indicated and at high points and other points necessary to free piping system of air. Connect 1/4 inch copper tubing to top of high point, or other location, and extend down to easily accessible 1/4 inch globe valve, mounted, grouped and tagged approximately five feet above floor. Discharge through 1/4 inch copper tubing to nearest floor drain, or as approved by the Engineer.
 2. Automatic Type Air Vent Valves. Provide where indicated, installed on short 3/8 inch minimum riser with globe valve in riser. Provide full size copper tubing drain line from automatic valve to nearest floor drain, or as approved by the Engineer.
- D. Chain Operators. Provide for valves located in exposed overhead piping seven feet or more above floors in mechanical equipment rooms.
- E. Pressure Reducing Valves. Install reducing stations along walls or other available spaces with arrangement to permit easy access for servicing and removal of equipment. Make piping flexible to permit springing pipe for breaking joints. Provide a 3-valve bypass at each reducing valve.
- F. Check Valves. Provide swing check valves unless otherwise indicated.

3.7 UNIONS, FLANGES AND GASKETS

- A. Unions. Provide unions where indicated and at each threaded or soldered connection to equipment, tanks and valves, with the following exceptions:
1. Provide three unions at each three-way automatic valve.
 2. Only one union is required at each manually operated threaded valve.
 3. In refrigerant piping systems only where indicated.
 4. None required at compression stops.
- B. Locate unions so piping can be easily disconnected for removal of equipment, tank or valve.
- C. Flanges. Provide flanges at each flanged connection to equipment, tanks and valves. Provide matching flange faces at each connection. Tighten fastener system to indicated torque.

3.8 INSULATING CONNECTIONS

- A. Provide electrical insulating flanges where indicated and at the following locations:
1. In each metallic water service connection into a building within five feet of building wall. If possible, install adjacent to valve or cock and above ground.
 2. At points of connection between copper water lines and steel domestic water heater tanks.
 3. At points of connection between ferrous and nonferrous metallic pipe.

3.9 FLEXIBLE PIPE CONNECTIONS

- A. Align and space piping accurately before installation. Do not use flexible connections to correct misalignment.
- B. Support piping near equipment to prevent weight of pipe from compressing or extending flexible connection from required installed setting.
- C. Install as recommended by manufacturer.
- D. Assemble flexible section with metal retaining rings, built-in braided wire, built-in reinforcement with restriction bolts, or with wire braid cover. Equip flanged assemblies with limit bolts to restrict maximum travel.
- E. Provide control units for pipe connectors at equipment mounted on vibration isolators, to limit travel.
- F. Provide pipe guides on each side of each expansion joint as recommended by the joint manufacturer.
- G. For all expansion joints, use joints with welded, flanged, or threaded ends, and bases for each joint unless otherwise indicated. Use single-element joints with bases as an end anchor where indicated. Use ball joints of stainless steel, malleable iron, ductile iron, carbon steel, bronze, or other alloys suitable for the service intended, in accordance with ANSI B31.1.0.

3.10 PROTECTIVE COATING FOR PIPE

- A. General. Spirally wrap steel pipe buried in ground and below concrete slabs with corrosion-protective tape applied with suitable primer after pipe has been thoroughly cleaned and dried and sharp points removed.
- B. Tape. Use tape in widths as recommended by manufacturer for pipe size being wrapped. Apply tape tightly with 1/2 inch minimum uniform lap, free from wrinkles and voids. Use approved wrapping machine for sections of pipe exceeding 50 feet of continuous length.
- C. Priming. Apply primer in accordance with tape manufacturer's recommendations.
- D. Field Joints, Fittings and Valves. Cover field joints and fittings with two full thicknesses of 10-mil thick tape to provide covering 20 mils thick over all surfaces. Use maximum one inch wide tape and extend wrapping minimum six inches over adjacent pipe covering. Apply tape with adequate tension so tape will conform and adhere tightly to surfaces of fitting without air pockets. Use putty type insulation compounds or molding tapes as recommended by tape manufacturer to fill voids, flange faces around bolts, and other irregular surfaces, to provide smooth, even surface for application of tape wrap.
- E. Valves. Cover pipe flanges and extend over outer edge of valve flanges or threaded portions of valve body. Give two heavy coats of cool tar enamel conforming to AWWA C203 to unwrapped surfaces of valves. Allow adequate drying time before backfilling.
- G. Testing

1. Test wrapped pipe, fittings, and field joints on jobsite, after assembly, with approved high voltage holiday detector, with positive signaling device to indicate flaws, holes, or breaks in wrapping. Conduct testing in presence of the Engineer.
2. Prior to starting test, complete all piping and place in bottom center of trench on temporary blocks to hold pipe high enough to allow testing electrode to be run along underside of pipe.
3. Set peak voltage of holiday detector at 10,000 volts. Do not exceed peak of 20,000 volts as determined by crest voltmeter.
4. Repair holidays and damaged or defective wraps with two complete wraps of tape. Do not cover wrapped pipe until testing and repairs have been completed and approved.
5. After design and repairs have been completed, carefully remove temporary blocks.

G. Handling and Storage. Handle and store wrapped pipe in banner to protect wrap from damage. Use padded wide skids or supports for temporary storing of wrapped pipe to prevent cutting of wrap. Where necessary, use wide rubber or canvas slings or cradles.

3.11 GAUGES

A. General. Provide gauge and gauge connections where indicated. Mount on gauge boards unless shown mounted on piping.

B. Gauge Boards

1. Mount in convenient location, where gauges may be easily read, at approximately five feet six inches above finished floor.
2. Construct boards of 12-gauge steel and paint dull black. Mount boards four inches from wall by means of 1/2 inch bolts fastened to wall in rear of boards. Use at least four anchor bolts with chromium-plated heads for each board.
3. Mount brass or laminated plastic indicating plate, 3/4 by 3 inches below each gauge, with service indicated in black lettering.

C. Gauge Cocks. Provide at each gauge connection to service main and, in addition, at each gauge installed on gauge board.

D. Gauge Siphon. Install at each hot water gauge.

E. Gauge Schedule. Provide at locations indicated and in accordance with the following schedule:

GAUGE SCHEDULE	
LOCATION	PRESSURE RANGE
One set of high and low pressure gauges for each refrigeration system.	As required for system indicated.
Low pressure side of air and water pressure reducing valves, and fire protection	As required for system indicated.

pipng system.	
Hot water and chilled water piping where indicated.	As required for system indicated.
On compressed air tanks.	0 to 200 psi

3.12 THERMOMETERS

- A. General. Install thermometers to be easily read by a person standing on the floor of the room. Use straight, angle or remote types to suit installation condition.
- B. Thermometers for Measuring Liquid Temperatures.
 - 1. Install with extension necks to suit insulation on pipes or the lining of tank.
 - 2. Install so bulb projects into flow stream and is completely immersed on liquid.
- C. Thermometer Schedule. Install at locations where indicated.

3.13 ACCESS PANELS

- A. Required Locations: Wherever valves, damper operators, fire dampers and similar items requiring servicing and adjustment are concealed. Panels are not required in furred ceilings with removable panels.
- B. Types
 - 1. In Acoustical Tile Ceilings: Fill-in type installed integral with tile pattern. Fill in with ceiling tile.
 - 2. In Fire Rated Ceilings: Fire rated access panel, fill-in type or flat-faced panel as required.
 - 3. All Other Locations: Flat-faced panel.

3.14 PIPE AND VALVE IDENTIFICATION

- A. General
 - 1. Identify exposed piping systems by means of colored stenciled or prefabricated legends with flow arrows. Apply after painting in accordance with Section 09900 - PAINTING, and cleaning of piping and insulation is completed. In general, provide brass tags on special fittings, valves and other operating devices, as well as equipment, to coordinate with maintenance program.
 - 2. Apply legend and flow arrow at valve locations, at points where piping enters or leaves wall, partition, bulkhead, cluster or piping, or similar obstruction, and at approximately 20-foot intervals on pipe runs.
 - 3. Changes in locations and spacing may be made with approval of the Engineer to meet specific conditions.

4. Wherever two or more pipes run parallel, apply printed legend and other markings in same relative location to be in either vertical or horizontal linearity, as appropriate.
5. Locate to be conspicuous and legible from any reasonable point.

B. Labels: Permanent type; painted color bands with stenciled letters, or prefabricated pressure-adhesive cloth tape color labels with color lettering, manufactured for piping identification.

1. Painted Color Bands with Stenciled Letters:

- a. Size of stenciled letter and flow arrows (inches):

Outside Diameter of Pipe or Covering	Width of Band	Size of Stencil Letter	Minimum Length of Flow Arrow
3/4 to 1-1/4	8	1/2	2-1/2
1-1/2 and 2	8	3/4	2-1/2
2-1/2 to 6	12	1-1/4	4
8 to 10	24	2-1/2	5
over 10	32	3-1/2	6

- b. Marking Schedule: Provide legends and band colors in accordance with ANSI A13.1.
- c. Color of Lettering: Fire water, fire-automatic sprinklers, white; all others, black.
- d. Color of Flow Arrows: Same as bands, or black or yellow with contrasting background for easy visibility.
2. Prefabricated Pressure-Adhesive Tape:
- a. Background, Legend and Flow Arrows: Letter size per schedule above (or nearest commercially available size) colors per ANSI A13.1.
- b. Installation: Cloth labels shall adhere tightly and neatly to pipe. Remove completely and reapply any labels that do not adhere, using suitable adhesive.

3.15 EQUIPMENT INSTALLATION

- A.** Place equipment in locations and spaces indicated. Move equipment into spaces through openings as required. Disassemble and reassemble equipment or other work necessary to accomplish this work.
- B.** Provide all platforms and hangers required for installation of mechanical equipment. Foundation drawings, bolt settings information, and foundation bolts shall be furnished prior to concrete foundation construction for all equipment.
- C.** Mount equipment on vibration isolation units, concrete inertia blocks, or concrete pads as required, in accordance with the approved Shop Drawings and Contract Drawings.

- D. Align and adjust equipment and vibration isolators in accordance with the manufacturer's recommendations.
- E. Install equipment furnished by the Authority in accordance with the above requirements.
- F. Install mechanical equipment where indicated with V-belts and cast iron machined and balanced V-groove sheaves.
- G. Key sheaves to shafts and lock with set screws.
- H. On electric motors NEMA size 48 and smaller, fasten sheaves with hardened knurled cup point set screws against flat surface on shaft.

3.16 FIELD TESTS AND SYSTEM BALANCING

A. General

1. Perform testing and balancing as necessary to assure that all mechanical systems are operating in accordance with the Contract Documents. The process includes the following:
 - a. Balancing of air and water distribution.
 - b. Adjustment of all systems to provide design quantities.
 - c. Verification of the performance of all equipment and automatic controls.
 - d. Measurement of power consumption, sound and vibration.
 - e. Recording and reporting the results.

B. Leakage Tests

1. Leak test piping after installation, but before backfilling of in-the-ground lines, or before pouring of slabs, or prior to the application of thermal insulation or concealment in shafts, hung ceilings or other places where leakage cannot be readily observed.
2. Furnish necessary materials, test pumps, gases, and labor required for testing.
3. Notify the Engineer at least three days in advance of tests.
4. After tests, repair any leaks to the satisfaction of the Engineer, and retest to determine if leaks have been remedied.
5. Perform testing of pipe and exhaust stacks when ambient air is approximately constant. When piping is pressure tested, bring each system up to pressure and seal. Before testing, remove nonpressure parts of traps, instruments and specialties. Conduct each test over a period of four hours during which time there shall be no appreciable drop in pressure on gauge. While under pressure, tap welded joints with a hammer to assist in discovering defects or lack of soundness.
6. When testing by air or gas pressure, check joints for leaks by means of soap bubble test.
7. Replace nonpressure parts after initial test and retest piping at operating pressure with steam, water, or instrument air, as appropriate, until joints are proven tight.

8. Tests

a. Test systems in accordance with the following schedule:

SYSTEM TESTED	TEST PRESSURE
Sanitary sewers, drains and vents within buildings	5 psig water, minimum
Storm drain system	40 psig water, minimum
Sprinkler piping	200 psig water
Domestic water	150 psig water
Heating hot-water system	c ig

b. Test sanitary sewer, drain and vent within building and storm drain systems in accordance with Massachusetts State Plumbing Code.

c. Test standpipe and hose systems in accordance with NFPA 14.

C. Sanitary Piping

1. Test at the completion of rough-in and before back filling or embedment or at times as directed by the Engineer.
2. After plumbing fixtures have been set and their traps filled with water, test entire drainage and vent system with smoke or peppermint.

D. Air and Water Systems Balancing and Testing

1. General Requirements. No test will be permitted unless pre-test requirements hereafter specified have been met.
 - a. Procure the services of an independent balance and testing agency approved by the Engineer to test and balance air distribution and water systems in accordance with Associated Air Balance Council Specifications for Air Systems and Air Distribution Test and Balance and Chilled and Hot Water Systems Balance.
 - b. Provide, maintain, and pay all costs for equipment, instruments, and operating personnel required for tests.
 - c. Make final adjustments or balancing to equip systems as required for acceptable operating conditions and to meet specified performance.
 - d. Replace or revise as required, equipment, systems or work found deficient during tests.
2. Pre-Test Requirements
 - a. Before operating equipment or systems, make thorough check to determine that systems have been flushed and cleaned as required and equipment has been properly installed, lubricated and serviced. Check factory instructions to see that recommended lubricants have been used.

- b. Use particular care in lubricating bearings to avoid damage by over-lubrication and blowing out seals. Check equipment for damage that may have occurred during shipment, after delivery, or during installing. Repair damaged equipment as approved or replace with new equipment.
 - c. After completion of requirements above and immediately before starting completion tests as specified herein, clean or renew air filter media.
 - d. Clean pipes free of scale and thoroughly flush piping systems. Provide temporary bypass for all water coils to prevent flushing water from passing through coils. Clean all strainers and valves. Fill all systems with the media required and remove air from the systems by operating the air vents.
 - e. Clean all debris from the inside of air handling equipment and plenums and then vacuum clean to remove small particles of rubbish and dust before operating the equipment and before installing outlet faces.
3. Completion Tests
- 1) Notify the Engineer at least three days in advance of starting these tests.
 - 2) Upon completion of pre-test requirements, or at such time prior to completion as determined by the Engineer, operate and test mechanical equipment for at least five consecutive eight-hour days to demonstrate satisfactory overall operation of system.
 - 3) Operate heating and air conditioning equipment and systems for not less than two eight-hour days for each system at not less than 90 percent of full specified heating and cooling capacities.
 - 4) Water Systems
 - 1) Balance each system by means of the balancing cocks and flow indicators. Make water measurements by means of calibrated orifices and portable flow meters or permanent type orifice flanges where indicated. Set automatic control valves to full flow conditions through coils during balancing procedure.
 - 2) After balancing, take running current readings at circulating pumps. Correct any pump motor which is overloaded as approved by the Engineer and at no additional cost to the Authority.
 - 3) Determine pump capacities by differential pressure measurements. Adjust water circuits by balancing cocks or automatic flow balancing valves. Permanently mark all balancing cocks after balance is complete so that they may be returned to their correct position if disturbed.
 - 5) If full-load conditions cannot be obtained for above tests, place equipment in proper condition for long shutdown or until such time as post-contract completion tests or pre-season start-up can be made as specified herein. Provide periodic checks as required and conform to manufacturer's recommendations for such shutdowns.
4. Post Contract Completion Tests. If for any reason required full-load operating conditions cannot be obtained at time of completion tests, the Contractor shall return to jobsite when requested by the Engineer and operate equipment systems at such time as will permit proper loading of equipment and systems as required. After notifications, seven calendar days will be allowed to start tests.
5. Pre-Season Start-up. When requested by the Engineer during guarantee period, start up for early heating or cooling season use, equipment and systems that have remained shut

down immediately after completion tests and that have not performed full load completion and post-contract completion tests.

6. Test Agency Reports. The test and balance agency shall record and submit to the Contractor for forwarding to the Engineer, complete test data and balance report certified by a Registered Professional Engineer. This report shall include the data for each system balanced as listed below:
 - a. Installed Equipment:
 - 1) Manufacturer of pump and motor
 - 2) Size of pump and motor
 - 3) Capacity and head of pump
 - 4) Motor, hp, volts, phase full load amps
 - b. Design Conditions:
 - 1) GPM
 - 2) Pressure at pump suction and discharge
 - 3) Motor hp
 - 4) RPM or pump
 - 5) GPM at each coil
 - 6) BHP of motor
 - c. Field Test Results:
 - 1) GPM
 - 2) Pressure at pump suction and discharge
 - 3) RPM of pump
 - 4) Operating amps
 - 5) Motor Operating BHP
 - 6) Temperature water at pump
 - 7) GPM at each coil

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 15250

MECHANICAL INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies furnishing and installing insulation for heating, ventilating, air conditioning, and plumbing systems
- B. The applicable requirements of Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK shall govern work of this Section.

1.2 DEFINITIONS

- A. Piping: Piping includes pipe, valves, strainers, and fittings.
- B. High Temperature Piping: Hot water space heating supply and return; domestic hot water supply and return; vapor vent piping in mechanical rooms; and all piping indicated as any kind of hot or tempered water.
- C. Low Temperature Piping: Refrigerant suction piping; chilled water supply and return, including integral suction and oil cooler chilled water piping on chillers; and any other piping so indicated.
- D. High Temperature Equipment: Heating coils, boilers, hot water storage tanks; and air eliminators; boiler breechings, and similar equipment operating at elevated temperatures.
- E. Low Temperature Equipment: Water chillers, cooling coils; air eliminators; and similar equipment operating at reduced surface temperatures.
- F. Air Conditioned and Heated Spaces: Are those spaces directly supplied with conditioned or heated air or provided with cooling or heating device.

1.3 SUBMITTALS

- A. Working Drawings
 - 1. Show layout and complete details for insulation installation including hangers, supports and anchors to be used.
 - 2. Show plan for performing the work including sequence of operations. Verify by field measurements and show on working drawings exact locations of existing utilities. Locations as indicated are approximate and are not intended for use in the preparation of Working Drawings.

- B. Shop Drawings. Show methods of fabrication, erection, and installation for each different type item that is to be attached to structures of buildings.
- C. Manufacturer's Literature. Provide manufacturer's literature completely describing products, including installation instructions.

1.4 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Deliver insulation materials with containers clearly marked with manufacturer's stamp or label attached showing manufacturer's name and brand name and type of insulation material by Engineer's designation, Type A, Type B, for example. Additionally, materials or their shipping cartons shall bear label indicating fire hazard ratings.

1.5 JOB CONDITIONS

- A. Protection
 - 1. Protect unfinished work at end of each workday from damage, contamination and moisture, by use of protective covers. Replace insulation which is damaged, wet, or otherwise contaminated.
 - 2. Cover openings in piping or ducting to prevent entry of insulation materials during installation of materials.
 - 3. Protect surrounding work from damage or contamination by insulation and associated installation materials.
 - 4. Perform work carefully to avoid damage to previously installed finish materials.
 - 5. Follow manufacturer's directions for safe use of materials complying with requirements of Part 2 Articles.
- B. Scheduling. Inspect, test and accept systems and equipment on which insulation materials are to be installed before starting work on this Section

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Fire Hazard Ratings
 - 1. When tested in accordance with ASTM E 84, NFPA No. 255, or UL723 insulations; including jackets; adhesives, coatings, and sealing compounds; and accessories provided shall have fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed, when applied separately or if they are factory fabricated they shall have same ratings when tested as assembly, except as follows:
 - a. Flexible unicellular insulation.
 - b. Nylon anchors for securing insulation to ducts or equipment.
 - c. Factory pre-molded one-piece polyvinyl chloride fittings and valve covers.
 - d. Treated wood blocks.

- B. Flameproofing Treatments: Materials subject to deterioration due to the effect of moisture or high humidity will not be acceptable.
- C. Vapor Barriers: Perm rating not more than 0.05 when tested in accordance with ASTM E 96.

2.2 PIPING INSULATION

A. Types

1. Type A, Mineral Fibre, Pipe Insulation: FS HH-I-558 as follows with vapor barrier, all-purpose jacket where required by Part 3 and presized glass cloth jacket:
 - a. Style 1, Typical Use (Pipe Covering, Molded, for Use thru 450 degrees F): Form D, Type 3, Class 12.
 - b. Style 2, When Used with Premolded One-Piece Polyvinyl Chloride Fitting Covers (Blankets or felts, Flexible): Form B, Type I, for use as follows:
 - 1) For Use Thru 350 Degrees: Class 6.
 - 2) For Use Thru 450 Degrees: Class 7.
2. Type B, Cellular Glass, Pipe Insulation: FS HH-I-551, Type II, provided with Class 4 jacket, all-purpose jacket where required by Part 3 and presized glass cloth jacket.
3. Type C, Cellular Glass, Pipe Insulation: FS HH-I-551, Type II, provided with vapor barrier, all-purpose jacket where required by Part 3 and presized glass cloth jacket.
4. Type D, Calcium Silicate, Pipe Covering for Temperatures Up to 1200 Degrees F: FS HH-I-523, Type 2, provided with Class of jacket as indicated in the Construction Specifications, all-purpose jacket where required by Part 3 and presized glass cloth jacket.
5. Type E, Plastic Unicellular Foam, Tube Type: MIL-P-15280, form T.

B. Schedule of Thicknesses:

Intended Use	Type	Pipe Size	Nominal Inches	Required Insulation Thickness
		1/4 1-1/4	1-1/2 3	3-1/2 10
Anti-Sweat	A	1/2	1/2	3/4
	B	3/4	3/4	1
	E	3/8	1/2	--
Low Temperature	A	3/4	1	1-1/2
	B	1-1/2	1-1/2	2
	E	1/2	3/4	--
High Temperature	A	1	1	1-1/2

	C	1-1/2	1-1/2	2
Anti-Freeze	D	1	1-1/2	2

2.3 EQUIPMENT AND DUCT INSULATION

A. Types

1. Type 1, Mineral Fiber, Blocks and Boards, For Use At Temperatures Thru 400 degrees F., Load Bearing Type: FS HH-I-558, Form A, Class 1; minimum density, three pounds per cubic foot; provided with factory-applied vapor barrier, except if indicated otherwise herein, and presized glass cloth jacket.
2. Type 2, Mineral Fiber, Flexible Blankets, For Use At Temperatures Indicated: Minimum density three-quarter pound per cubic foot, provide with factory-applied vapor barrier, conforming to FS HH-I-558, Form B of following classes as indicated:
 - a. Class 6: For use at temperatures thru 350 degrees F.
 - b. Class 7: For use at temperatures thru 450 degrees F.
3. Type 3, Cellular Glass, Blocks and Special Shapes: FS HH-551, of following types:
 - a. Type I: Blocks
 - b. Type III: Special Shapes
4. Type 4, Calcium Silicate Blocks For Use Up To 1200 Degrees F., On Surfaces Other Than Aluminum or Stainless Steel: FS HH-I-523.

B. Schedule of Thicknesses

1. Low Temperature Equipment Insulation
 - a. Type 1: 1-1/2 inch
 - b. Type 2: 2 inch
 - c. Type 3: 2 inch
2. High Temperature Equipment Insulation
 - a. Type 1: 1-1/2 inch
 - b. Type 3: 2 inch
 - c. Type 4: 2 inch
3. Ductwork and Plenum Insulation
 - a. Low Temperature Insulation
 - 1) Type 1: 2 inch
 - 2) Type 2: 1-1/2 inch
 - 3) Type 3: 2-1/2 inch
 - b. High Temperature Insulation: Same types as specified above, except with no vapor barrier.

2.4 DUCT AND PLENUM LINING

- A. General: FS HH-I-545, Type 1 or 2 except as otherwise specified herein.
- B. Lining thickness: One inch.

- C. Lining Density: Between 1.35 and 3.3 pounds per cubic foot, designed specifically for lining of ducts.
- D. Air Velocity Rating: Air-side surface of the liner capable of withstanding air velocity of 4,000 feet per minute without delamination or erosion for service in low-velocity duct systems.
- E. Liner Composition: Of uniform density, graduated density, or dual density, and coated or uncoated, as standard with the manufacturer.
- F. Sound Absorption Coefficient: Not less than indicated in table below as determined by procedures in Bulletin XXXI of the Acoustical and Insulating Materials Association, Mounting No. 6.

OCTAVE PASS BANDS	2	3	4	5	6	7
Mid-frequency, Cycles per Second	125	250	500	1000	2000	4000
Sound Absorption Coefficient	.25	.48	.67	.88	.89	.79

2.5 INSULATION JACKETS

- A. Vapor Barrier Jackets for Piping, Equipment, and Ducts insulation: FS HH-B- 100 of the following types:
 - 1. Piping and Equipment: Type I.
 - 2. Ducts: Type II.
- B. Presized Glass Cloth Jackets
 - 1. General. Type with integral vapor barrier may be used in lieu of separate vapor barrier material complying with this Part 2 Article, providing it complies with FS HH-B-100 permeance requirements and type requirements listed herein.
 - 2. Class Cloth Material. Provide material having puncture resistance of not less than 100 when tested in accordance with ASTM D 774; and mold growth resistant.
- C. All-Purpose Jackets
 - 1. Type: Manufacturer's standard type complying with the following requirements:
 - a. Physical Characteristics

Physical Properties	Requirements or Limits
Permeance rating ASTM E96, Procedure B in perms	Not more than 0.02

Puncture Resistance, ASTM D781; in Beach units	Not less than 50
Tensile Strength, ASTM D 828, in pounds per inch cross direction	Not less than 35

D. Metal Jackets, factory fabricated; aluminum alloy, minimum 0.016 inch thick; having Z-type longitudinal joint seam and minimum two inch wide aluminum circumferential butt joint strips, machine bonded.

E. Metal Covers. Aluminum, same alloy and thickness as metal jackets unless otherwise indicated.

2.6 ADHESIVES, CEMENTS, COATING, AND SEALING MATERIALS

A. General. Provide materials compatible with materials to which they are applied, and of type that will not corrode, soften or otherwise attach such materials in either wet or dry condition.

B. Type A, Lap Adhesive Used for Vapor Barrier Jackets: MIL-A-3316, Class 2.

C. Type B, Lagging Adhesive: MIL-A-3316, Class 1.

D. Type C, Insulation Cement: FS-SS-C-160, any type except Type II or any other type that contains any asbestos.

E. Type D, Bonding Adhesive for Securing Insulation to Metal Surfaces: MIL-A-3316, Class 2.

F. Type E, Bedding Compound and Joint Sealers: MIL-B-19564.

G. Type F, Tape: Pressure-sensitive vinyl plastic type, as recommended by manufacturer.

H. Coating Compounds

1. Type 1, Used as Vapor Barrier: MIL-C-19565, either Type I or Type II.
2. Type 2, Used as Metal Protection: MIL-C-18480.
3. Type 3, Used as Weatherproofing Protective Finish: MIL-C-19565, Type I.
4. Type 4, Used as Vapor Barrier for Fittings on Piping Systems Above 35 Degrees F.: Polyvinyl chloride material conforming to FS L-P-535, Composition A, Type II, any grade unless otherwise indicated.
5. Type 5, Tape, Glass: MIL-C-20079, Type II, Class 1.

2.7 ACCESSORIES

A. Insulation Inserts: Provide calcium silicate, cellular glass, prestressed molded glass fiber minimum 13 pound density and same thickness as adjacent insulation.

B. Protection Inserts: FS WW-H-171, Type 41, 180 degree type.

C. Fasteners

1. Staples
 - a. Material: Aluminum or zinc-coated steel.
 - b. Dimensions
 - 1) Width: Minimum three-quarters of an inch.
 - 2) Thicknesses
 - a) Aluminum: Not less than 0.007 inch.
 - b) Zinc-Coated Steel: Not less than 0.005 inch.
 2. Anchor Pins and Speed Washers: As recommended by manufacturer for type and thickness of insulation.
- D. Bands for Metal Jackets: Minimum three-eighths of inch wide and 0.020 inch thick.

2.8 FABRICATIONS

A. Duct Liners

1. Insulation: Two continuous layers of 1/2 inch thick insulation, as specified in Part 2 Article above for duct and plenum lining.

B. Low Temperature Equipment Insulation

1. Form fabricated insulation to fit the equipment.
2. Bevel insulation edges to insure tight joints when insulation is to be used on round surfaces of equipment.

C. For Fittings, Flanges and Valves. Fabricate metal covers of material having same thickness as jacket material on adjacent piping.

2.9 FINISHES

A. Interior Insulation

1. Where Exposed to View But Not Designated to Receive Presized Glass Cloth or All-Purpose Jacket Materials: Apply presized glass cloth or Type 5 coating compound embedded in wet coat of Type B adhesive material.
2. Painting: Section 09900 - PAINTING.

B. Insulation Exposed to Weather

1. Insulation Types Except Type E and Items Designated to Receive Aluminum Jackets or Covers: Apply two coats of Type 3 coating compound.
2. Type E, Insulation: Vinyl lacquer system as specified in Section 09900 - PAINTING.
3. Other Painting: Section 09900 - PAINTING.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect surfaces to be insulated, and verify that surfaces are dry and free of rust, scale, dirt or other foreign material that would impair application of insulation materials.
- B. Do not proceed with work of this Section until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stuff or cap-off any openings to prevent entrance of insulating materials into open ducts or building spaces.
- B. Determine any required precautions for use of materials used for installing insulation materials. Post safety precautions as required.
- C. Clean and pretreat surfaces which are to receive adhesives, paints or other finishes, in accordance with manufacturer's instructions and recommendations.

3.3 INSTALLATION REQUIREMENTS

A. Insulation of Piping Systems

- 1. Piping
 - a. Provide piping with insulation type with or without vapor barriers as scheduled in Part 2 Articles and as indicated. Do not insulate the following:
 - 1) Chrome plated pipes.
 - 2) Pipes used solely for fire protection.
 - 3) Vibration isolating connectors.
 - 4) Access plates or doors in ducts or plenums of air heating systems.
 - b. In addition to requirements of this Part 3 Article, provide piping with all-purpose jacket, except piping exposed to weather or designated to receive Type E piping insulation.
 - c. Where piping is specified to receive both vapor barrier and all-purpose jacket, vapor barrier may be integral with jacket.
 - d. At locations where insulation butts items listed in this Part 3 Article, neatly terminate and bevel adjacent insulation.
 - e. At locations exposed to weather, provide coating compound Type 3 and metal jacketing.
- 2. Fittings, Flanges, and Valves
 - a. Provide insulated fittings, flanges and valves complying with Part 3 Articles herein, unless otherwise indicated.
 - b. At Locations Exposed to Weather
 - 1) Provide fittings except if indicated otherwise herein, flanges, and valves with coating compound Type C and metal covers. Secure covers in place with metal bands and seal with Type 3 coating compound.

- 2) Provide elbows and curved piping with coating compound Type 3 and factory-fabricated metal covers.

B. Equipment and Duct Insulation

1. General. Provide equipment and ducts with vapor barriers as scheduled in Part 2 Articles and as indicated.
2. Ducts
 - a. Insulate supply and return ducts unless indicated otherwise. Do not insulate the following:
 - 1) Air conditioning return ducts in air conditioned spaces.
 - 2) Heating return ducts in heated spaces.
 - 3) Ducts with acoustical linings.
 - 4) Ventilation exhaust or return ducts.
 - b. Insulate return ducts from outside air intake to air handling unit, including flexible runouts, plenums, and casings.

3.4 INSTALLATION OF INSULATION

A. General

1. Install insulation materials in accordance with manufacturer's instructions and recommendations, Construction Specifications, and as specified herein.
2. Install insulation materials having smooth and even surfaces, with jackets drawn tight and smoothly cemented down longitudinally and at end laps.
3. Neatly finish insulation at pipe and duct hangers.
4. Ensure insulation is clean and dry when installed and during application of finish materials.
5. Install insulation continuous through hangers, sleeves, wall and ceiling openings, except at fire dampers in duct systems.
6. Individually insulate piping and ductwork.
7. Where plumbing pipes are located in wall chases and space does not permit installation of sectional insulation, when accepted by the Engineer, indicated piping insulation may be omitted provided chases are packed full of either mineral fiber or rock wool.
8. Provide complete moisture and vapor seal wherever insulation terminates against metal hangers, anchors and other projections through insulation on cold surfaces designated to receive vapor seal.

B. Installation Pipe Insulation

1. Sectional Pipe Insulation Except Type E
 - a. Place sections of insulation around pipe and tightly butt into place. Additionally, install pipe insulation such that section butt joints occur at intervals as indicated on continuous pipe runs.
 - b. Apply Type 1 coating compound to jacket laps, then draw laps tight and smooth and secure with staples spaced not more than four inches on center and one inch from edge of lap, except do not use staples to secure jacket laps on pipes containing fluid medium at temperatures below 35 degrees F.
 - c. Insulation Joints
 - 1) Circumferential

- a) Cover with butt strips, not less than three inches wide with material same as insulation jacket material.
 - b) Secure butt strips with Type 1 coating compound and secure with staples installed on both edges of butt strip, except staples may be omitted when factory-applied self-sealing system is used unless fishmouths develop.
 - c) Seal staples and seams with one coat of Type 1 coating compound.
 - 2) Butt Joints
 - a) Seal ends of pipe insulation with Type 1 coating compound that butt fittings, flanges and valves, and insulation butt joints on continuous runs of pipe.
 - d. Penetrations
 - 1) At penetrations fill voids in insulation with Type 1 coating compound and seal penetration with coat of same material.
- 2. Sectional Pipe Insulation Type E
 - a. Install insulation by either slipping over piping or split insulation and place it around piping.
 - b. Joints
 - 1) Butt and Ends Joints. Seal butt joints and ends of pipe insulation with either Type F sealing material or Type A adhesive material.
 - 2) Longitudinal Joints. Seal joints with Type A adhesive material and secure with Type F sealing material minimum nine inches on center.
- 3. At Hangers, Sleeves and Pipes Two Inches and Larger
 - a. Install insulation continuous through pipe hangers and sleeves.
 - b. At hangers where pipe is supported, provide insulated protection shields.
 - c. At Pipes Two Inches and Larger:
 - 1) Insulation Inserts. Provide inserts at hanger support points complying with following requirements:
 - a) Having length not less than length of protection shields.
 - b) Having sufficient compressive strength to adequately support pipe without compressing inserts to thickness less than adjacent insulation.
 - 2) Face inserts with vapor barrier material same as facing on adjacent insulation.
 - d. At Pipes Passing Through Sleeves
 - 1) General. Install metal jacket over insulation where caulking is required.
 - 2) Interior Walls. When penetrating walls, extend metal jacket minimum two inches of either side of wall and secure each end with band.
 - 3) Floors. When penetrating floors, extend metal jacket from point below backup material to point minimum 10 inches above floor unless otherwise indicated, and provide one band at floor and one minimum one inch from end metal jacket.
- 4. Elbows, Fittings, Valves Unions and Anchors
 - a. General. After segments of piping insulation are installed, cover flanges, elbows, fittings, valves, unions and anchors.
 - b. Elbows. Cover with not less than three segments of insulation.
 - c. Other Fittings and Valves
 - 1) Either cut segments to required curvature, or use nesting size sectional insulation.
 - 2) Place and join segments of insulation with Type E adhesive.
 - 3) After segments are installed, apply one coat of Type 1 coating compound.
 - d. Unions

- 1) Where unions are indicated not to be insulated, terminate covering neatly at union ends with Type C cement material, trowelled on bevel.
- 2) Apply one coat of Type 1 coating compound to beveled ends.
- e. Anchors
 - 1) Insulate anchors same as adjacent piping for distance not less than six inches from surface of pipe insulation, unless otherwise indicated.
 - 2) Apply one coat of Type 1 coating compound.
5. Installation Metal Jacketing
 - a. Apply metal jacketing over outer layer of insulation on piping flanges, valves and other fittings.
 - b. Secure jackets to pipe insulation using only butt straps machine bonded.

3.5 INSTALLATION OF DUCT AND PLENUM INSULATION

A. Methods of Installation

1. Rigid Duct Insulation
 - a. Fastening System
 - 1) General. Provide pin or anchor type fasteners.
 - 2) Secure fasteners to duct surfaces with Type D adhesive.
 - 3) Install fasteners located more than three inches from edge of rigid insulation materials and spaced on not more than 12 inch centers.
 - b. Installation Method
 - 1) Install insulation by impaling on fastener system in such a manner that joints between adjacent pieces of insulation material are tightly butted.
 - 2) Secure insulation with washers and clips.
2. Non-Rigid Duct Insulation. Install in accordance with requirements specified in the Construction Specifications.

3.6 INSTALLATION OF EQUIPMENT INSULATION

- A. General. Insulate equipment with types of insulation as scheduled in Part 2 Articles and as indicated.

3.7 ADJUSTING AND CLEANING

- A. Fill joints, breaks, and punctures in insulation materials with Type 1 coating compound and cover with vapor seal material identical to adjacent materials in accordance with manufacturer's instructions and recommendations.
- B. Clean installed insulation surfaces.
- C. Remove scrap materials and adhesives.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 15400

PLUMBING SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies plumbing systems. Applicable requirements of Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK apply to the Work of this Section.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 01020 – ALLOWANCES
 - 2. Section 07840 - FIRESTOPPING
 - 3. Section 13347 – PREFABRICATED WORK PLATFORMS

1.2 SUBMITTALS

- A.** Shop Drawings
 - 1. Show complete details for installation of materials and each item of equipment.
 - 2. Include details of controls and instrumentation wiring, where applicable.
 - 3. Coordinate compressed air piping design with manufacturer's design of the work platforms. Indicate coordination on the shop drawing submittals.
- B.** Working Drawings: Show layout and complete details for piping installation, including hangers, supports and anchors.
- C.** Manufacturers' Literature: Submit for each different type material or product complete descriptions, and catalog data that indicates makes, types, and trade designations, including wiring diagrams and performance curves where applicable.
- D.** Operations and Maintenance Data: Submit operating and maintenance instructions for each different type of equipment provided.

1.3 QUALITY ASSURANCE

- A.** Protect unfinished work at the end of each workday from damage and contamination and moisture by the use of plugs, caps or covers.
- B.** Following cleaning and sterilization of the water piping system provide proper protection against any contamination. Where any contamination is admitted to the system, or when the safe status of the sterilization is voided for any reason, completely re-sterilize the system and obtain acceptance of the Engineer prior to further use.

- C. Do not use installed fixtures and equipment, except for testing.
- D. Provide adequate protection of chemicals used for the work, to prevent injury to personnel or damage to the system and fixtures.
- E. Instruct personnel in use, handling and storage of hazardous chemical products.
- F. Provide necessary washdown facilities for neutralizing effects of chemicals, which are improperly used or handled, or accidentally contacted.
- G. Protect personnel from damage or injury from hot water system faults during installation and testing.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver fixtures and trim to construction site in original packing crates or boxes, packaged in a manner that will give adequate protection to contents and preserve article in original condition.
- B. Handle fixtures carefully to prevent surface damage or breakage during unpacking, storage and installation.
- C. Cover installed and stored fixtures to protect against damaged by dirt, water, chemicals and mechanical injury.

1.5 QUALITY CONTROL

- A. Requirements of Regulatory Agencies: The work under this Section shall conform to applicable requirements of the Massachusetts State Plumbing Code.

PART 2 – PRODUCTS

2.1 PIPING AND FITTINGS

- A. Sanitary Sewer, Waste and Vent
 - 1. Two inches and Larger Above Ground: Class A, C, D, E or J
 - 2. One and One-half inches and Smaller Above Ground: Class J or R
 - 3. Below Ground or In Concrete: Class C or D
- B. Drain
 - 1. Above ground: Class A, C or D
 - 2. Below Ground: Class C or D
- C. Hot and Cold Water
 - 1. Above Ground: Class K, L or M
 - 2. Below Ground: Class K

- E. Compressed Air: Class U

2.2 METALS AND FINISHES

- A. Metal Parts: Use metal parts of brass with chromium plating on exposed surfaces except as follows:
 - 1. Metals and finishes specified elsewhere herein.
 - 2. Brackets, hangers and other supports for fixtures, provided they are located not to be normally subject to sight or contact by the user after installation, and not to cause stains on wall and fixture surfaces.
- B. Chromium Plated Finish: Smooth plated surface, plated to produce durable, adherent, uniform finish free from blisters, pits and other surface defects with a bright or polished finish on exposed surfaces.

2.3 FITTINGS AND TRIM

- A. Chrome plated brass having exposed threads chrome plated, unless otherwise specified.
- B. Provide fittings with name or registered trade mark of manufacturer legibly cast or stamped thereon.

2.4 WATER CLOSET

- A. General: FS WW-P-541/ 1A.
- B. Water Closet: Type II, Style D, Class 9, wall mounted, vitreous china, 1-1/2 inch top spud
- C. Flush Valve: Type I, Style 1, Model A with water saver, supply control valve having non-hold open feature, tamper-proof trim wall plate, backflow preventer, flush pipe and escutcheon for inlet spud.
- D. Seat: Type IV, Class 4, black, with stainless steel check hinge

2.5 URINALS

- A. General: FS WW-P-541/2A, vitreous china, Type 1, Style A, Class 1
- B. Flush Valve: Type 1, Style A, Class 1 with water saver, supply control valve having non-hold open feature, tamper-proof trim, wall plate, backflow preventer, flush pipe and escutcheon for inlet spud.

2.6 LAVATORIES AND FITTINGS

- A. General: FS WW-P-541/4A, enameled cast iron, Type I, wall mounted
- B. Dimensions: Width, 20 inches; length from wall, 18 inches

- C. Lavatory Outfit: Type III combination supply and drain fittings, suitably adapted to fixture, with replaceable valve seats, 2.5 gpm delivery and 0.5 gpm restrictor for hot water, grid drain with tail piece, "P"-trap with clean-out supply assembly with loose key stops.

2.7 WHEELCHAIR LAVATORIES AND FITTINGS

- A. General: FS WW-P 541/4A, vitreous china, Type V, Class 4, wall mounted
- B. Dimensions: Width, 20 inches; length from wall, 27 inches
- C. Lavatory Outfit: Type III gooseneck supply fitting having four-inch control handles, aerator, loose key stops, 2.5 gpm delivery, 0.5 gpm restrictor for hot water, "P"-trap with cleanout plug.

2.8 CHAIR SUPPORTS FOR WALL HUNG FIXTURES

- A. Water Closets: FS WW-P-541/1A, Type II.
 - 1. Fully adjustable both vertically and horizontally, supporting fixtures so that no part of fixture will be supported by wall or partition.
 - 2. Provide carrier with threaded outlet connection for four-inch pipe and with adjustable brass sleeve, gasket-fastening bolts to suit installation, cap nuts and washers.
- B. Urinals: Metal chair carriers, full-length in-the-wall type, same as specified above for water closets.
- C. Lavatories: FS WW-P-541/4A with chair carrier with concealed arm supports and legs to floor.

2.9 TRAPS

- A. Traps for Fixtures: Cast brass "P"-trap with cleanout.
- B. Traps for Drains: Plain pattern trap having seal of not less than two inches and not greater than four inches. Provide 1-1/2 and 2-inch traps of heavy cast brass and all other traps of materials specified for the piping system to which they are connected.

2.10 CLEANOUTS

- A. General: Use cleanouts turning up through architecturally finished floors made of a long sweep ell two-1/8 bends or Y and 1/8 bend and machine finished brass plate of sufficient diameter to cover opening in floor with cleanout plug having solid head tapped for 1/4 inch brass machine screw to secure the cover plate.
- B. For Cast Iron Bell and Spigot Pipe: As specified in Section 15050.

2.11 VACUUM BREAKERS

- A. Chromium plated brass, sized to provide an air area at least equal to piping served, and of type approved for use by Authorities having jurisdiction.

2.12 SHOCK ABSORBERS AND WATER HAMMER ARRESTERS

- A. Plumbing and Drainage Institute Standard PDI-WH-201, all brass body with phosphor bronze bellows precharged with nitrogen and glycerine and ready for installation in the piping system.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. General:

1. Test plumbing system in accordance with Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK, and requirements and as specified herein.
2. Prior to performance of plumb tests, confirm that specified piping disinfection has been completed.

B. Disinfection:

1. Disinfect potable water system prior to use as required by the agency having jurisdiction. Follow method that is prescribed by the health authority or, in case no method is prescribed by them, in accordance with requirements of Part 1 "Submittals" Article.
2. Obtain approval prior to further use of the water system.

C. Test of Installed Fixtures:

1. Test each installed fixture to confirm proper functional operation for purpose intended, as shown on the accepted Working Drawings.
2. Correct any defects, replace and repair defective work at no additional cost to the Authority. Retest as required.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Except as follows, separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.
1. Modifications of latent conditions related to underfloor and cavity wall utility and plumbing systems required to accommodate Work of this Contract will be paid for under an allowance for Item 1500.201 – PLUMBING SYSTEM. Latent conditions shall be such hidden and unknown conditions not indicated or inferred in the Contract Documents, and that could not be reasonably inferred from common plumbing trade practice. The allowance will be adjusted to the actual amount paid for all such work. The Contractor shall furnish itemized statements of the work performed and give the Engineer access to accounts, bills, and vouchers relating thereto, and unless the Contractor does furnish such itemized statements, bills, and vouchers, he shall not be entitled to payment for the related work. The allowance will be made to reimburse the Contractor for all services required for the work specified herein.

1.2 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS
1500.201	PLUMBING SYSTEM	AN

END OF SECTION

SECTION 15500

FIRE PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies interior fire protection systems. Applicable requirements of Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK apply to the Work of this Section. Provide the following systems:
1. Wet-pipe sprinkler systems.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 07840 - FIRESTOPPING.
 2. Section 13347 - PREFABRICATED WORK PLATFORMS

1.2 SUBMITTALS

- A.** Working Plans and Certificates. Provide Engineer with number of copies as directed of approved items complying with requirements of the following paragraphs.
- B.** Shop Drawings
1. General
 - a. Provide drawings made at minimum 1/4-inch equals one-foot scale.
 - b. Provide drawings complying with applicable requirements of NFPA No. 13.
 2. Submit drawings for sprinkler systems, showing layout, location, size of system components, including complete reflected ceiling and above ceiling plans, and electrical layout and installation requirements; and details of materials and methods of attachment and sleeve construction.
 3. Coordinate fire protection system design with manufacturer's design of the work platforms. Indicate coordination on the shop drawing submittals.
- C.** Manufacturer's Literature: Provide literature completely describing products, including performance curves and wiring diagrams.
- D.** Certificates: Provide certificates certifying compliance of materials and work with standards designated.
- E.** Operation and Maintenance Data:

1. Provide complete instruction, including catalog cuts, diagrams, drawings and other descriptive data covering proper operation, maintenance of each type of system installed, and necessary information for ordering replacement parts. Additionally, include copy of NFPA 13A and 198.
 2. Provide copies of complete instructions capable of being posted at each alarm-check valve location; in the format, and materials and method of attachment, as accepted by the Engineer.
- F. Maintenance Materials. Submit in manufacturer's standard unopened containers; with label affixed, showing manufacturer's name, brand name, and type of item contained within; products complying with requirements of Part 2 "Wet Pipe Sprinkler Systems" Article.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Protection
1. Protect work, equipment and materials from dirt, water chemical or mechanical damage.
 2. Close pipe openings with caps or plugs during installation.

1.4 QUALITY CONTROL

- A. Requirements of Regulatory Agencies
1. Provide fire protection systems conforming to requirements of NFPA No. 13 and requirements of governmental agencies having jurisdiction.
 2. Working Plans and Certificates: Provide working plans, calculations and materials and test certificates, to governmental agencies having jurisdiction as required for approval.
 3. Fire-Rating Testing Agency Requirements: Testing agency for fire rating certification shall have approval of authority having jurisdiction.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide materials and equipment that have fire rating certification, listing and label where applicable, complying with requirements of this Section.

2.2 WET-PIPE SPRINKLER SYSTEMS

- A. General
1. Sprinklers
 - a. Provide sprinklers of listed types specifically selected for areas and hazards they are to protect, such as standard, corrosion resistant, wax-coated, upright, pendent, chrome-plated or other type as indicated.
 - b. Provide number of spare sprinklers as indicated.

PART 3 - EXECUTION

3.1 GENERAL

- A.** Welding will not be permitted except on specific written authorization of the Engineer. When authorized, welding shall be in accordance with NFPA No. 13 and AWS D10.9 level AR-3.
- B.** Provide for thermal expansion of piping by loops or expansion joints in accordance with requirements of Part 1 "Submittals" Article. Additionally, provide anchors, guides and other devices as required for proper support and as indicated.
- C.** Provide for complete drainage of the systems. Run piping with sufficient pitch and provide drain valves at low points in piping.
- D.** Connections and Joints: Provide threaded connections, grooved, and brazed and soldered joints complying with requirements of NFPA No. 13.

3.2 FIELD QUALITY CONTROL

A. Preparation

- 1. General: Prior to acceptance testing, fire protection systems shall be flushed and then disinfected.
- 2. Flushing: Flush fire protection systems with clean water until it is free of scale, slag, dirt grease or other foreign material in accordance with applicable requirements of Part 1 "Submittals" Article.
- 3. Disinfection: Disinfect systems by filling them with solution containing not less than 50 parts per million of chlorine and let stand for minimum 24 hours. Then flush systems with clean water until residual chlorine content is not greater than 0.2 parts per million.

B. Acceptance Testing Certification and Approvals

- 1. Perform acceptance testing and certification of fire protection systems and obtain approvals in accordance with applicable requirements of Part 1 "Submittals" Article. Testing must include water flow and pressure per NFPA.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 15600

HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies HVAC systems. Applicable requirements of Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK apply to the Work of this Section.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 07840 - FIRESTOPPING.
 - 2. Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK.
 - 3. Section 15800 - AIR DISTRIBUTION.
 - 4. Section 16050 - BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK.

1.2 SUBMITTALS

- A.** Working Plans and Certificates
- B.** Shop Drawings
- C.** Operation and Maintenance manuals

1.3 DELIVERY, STORAGE, AND HANDLING

- A.** Protection
 - 1. Protect work, equipment and materials from dirt, water, chemical, or mechanical damage.

1.4 QUALITY ASSURANCE

- A.** Requirements of Regulatory Agencies

PART 2 - PRODUCTS

2.1 PIPING

- A.** Pipe and Fittings: As specified in Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK and complying with the following requirements:

Service	Class
1. Hot Water Heating	T

2.2 AIR CONDITIONING AND HEATING – PACKAGED (HEAT PUMP)

- A. Cooling Unit: One-piece, factory-assembled, tested, precharged, prewired and ready-to-operate unit, designed for roof mounting including a package rooftop adapter matching the basic machine.
- B. Total Cooling and Heating Capacity: Not less than indicated.
- C. Provide unit containing an indoor filter and fan section, compressor section and necessary electrical controls, enclosed in a single weatherproof casing.
- D. Include a welded or bolted hermetic compressor with suitable vibration isolators, crankcase heaters and automatically reversible oil pump. Include in the refrigerant piping filter-dryer, solenoid valve, expansion valve and sight glass.
- E. Coils: Nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubing, with all joints brazed.
- F. Indoor Fan: Centrifugal forward-curved blower, belt-driven by a permanently lubricated motor of appropriate size mounted on vibration elimination base, fan shaft bearings permanently lubricated type and fan rated as indicated with an external static pressure established by the manufacturer to suit the accessory package specified hereinafter.
- G. Outdoor Fan: Propeller type, direct-driven by a heavy duty, permanently lubricated motor with a safety guard. Provide unit such that it shall be unnecessary to run the condenser fan to obtain ventilation.
- H. Cabinet: Constructed of galvanized 18 and 16 gauge steel, bonderized and finished with baked enamel top, bottom and sides of the cooling and heating exchanger sections fully insulated to prevent sweating and to muffle sounds. Include provisions for draining base pan through a drain connection. Provide an opening for power connections and panels easily removable to provide access for servicing. Provide a filter section with replaceable 2-inch fiberglass files easily removed and replaced. Install new filters to replace existing filters upon acceptance.
- I. Provide electrical control assembly containing a low voltage control circuit transformer, compressor relay, fan relay and a compressor motor timing circuit to prohibit restarting of compressor motor more than once every five minutes. Provide compressor protection devices of the automatically reset type. In addition, include a "free cooling" adapter and room thermostat equipped with an "on-off" switch for manual seasonal use. Equip compressor to prevent operation when outside air is below 40°F. Provide head pressure control.
- J. Provided a factory built and wired accessory adapter with self-contained positioning motor and damper to continuously proportion amount of outdoor air to return air up to a normal

requirement, a roof curb, a fiberglass duct package and a combination supply and return duct-mounted air diffuser, together with concentric duct package, as part of the package.

- K. Heat Section: Provide heat pump type unit.
- L. Auxiliary Heating Section: Coil shall be an electric unit-mounted (inside RTU / heat pump) in accordance with UL 1995 and NFPA 70. Coil shall be of the nickel chromium resistor, single stage, strip or nickel chromium resistor, single stage, strip or stainless steel, fin tubular type.
- M. Provide central control panel, with lights indicating power on, pilot outage, clogged filter, safety control reset, fan-on-auto and heat-off switches.

2.3 PORTABLE FUME EXTRACTOR UNIT EQUIPMENT

- A. Fume Extractor Unit: Mobile unit type fume extractor, filter as part of the overall fume extractor unit package, silencer, spark protection devices, and spotlight.
- B. Mobile-type fume extractor with extractor arm.
- C. Filter cartridges with 99% separation efficiency
- D. Fume Extractor Unit manufactured by Nederman or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation work shall include all receiving, storing, removing from storage, rigging, uncrating, setting, assembling and aligning necessary to prepare each item of equipment and its integral parts for normal continuous operation. Installation includes assembly and erection of equipment, specialties, controls, instruments and all other accessories furnished by the manufacturer with his equipment. Installation includes initial startup of all equipment, and initial operation of the complete heating, ventilating and air conditioning systems as indicated.
- B. Furnish all necessary loading and hauling equipment, scaffolding, rigging, cranes, hoists, dunnage and such tools and instruments required to assemble, install, align, connect and make ready for operation all equipment, whether furnished by the Contractor or the Authority.
- C. Install equipment and piping systems in accordance with Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK, the manufacturer's recommendation and as indicated. Install insulation in accordance with Section 15250 - INSULATION. Install Air distribution System in accordance with Section 15800 - AIR DISTRIBUTION.
- D. Heating
 - 1. Install the heating system complete and ready for operation, as indicated. Include operating and safety control wiring.
- E. Air Conditioning

1. Install air conditioning system complete and ready for operation, as indicated.
2. Mount each package-cooling unit on the roof with the approved rooftop adapter. Drainage of the base pan shall be installed.
3. In addition to the control assembly, install the "Free-Cooling" adapter and room thermostat.

F. Heating and Air Conditioning

1. Install the heating and air conditioning system-complete and ready for operation, as indicated.

G. Valves

1. Install valves at the locations indicated, and where required for proper functioning of the system.
2. Provide gate valves unless otherwise indicated. Install all valves with their stems horizontal, or above.

3.2 TESTS

- A.** Upon completion and prior to acceptance of the installation, test all systems as may be required by the Engineer to demonstrate satisfactory functional and operating efficiency. Operating tests shall cover a period of not less than six hours for each system, and all tests shall be conducted at such time as the Engineer may approve. Provide all instruments, facilities and labor required to properly conduct the tests. Electric power required will be furnished by the Authority. Balance air handling systems and provide three copies of the readings to the Engineer.

3.3 AUTHORITY-FURNISHED EQUIPMENT

- A.** Contractor shall provide all labor and material to install, support and connect all equipment furnished by the Authority.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A.** Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 15800

AIR DISTRIBUTION

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies ductwork and accessories for air distribution system, including testing and balancing. Applicable requirements of Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK apply to the Work of this Section.
- B.** Related work. This will include section 15250-Insulation.

1.2 REFERENCES

- A.** ADC - Air Diffusion Council
- B.** ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
- C.** SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.

1.3 SUBMITTALS

- A.** Qualifications for Balancing and Testing: Submit materials as required complying with requirements of Part 1 "Quality Control" Article.
- B.** Test Reports of Air Balancing
 - 1. General: Submit three copies of complete air balance report certified by registered professional engineer. Include data for each system balanced as listed below.
 - 2. Air Balance, Air Handling Equipment, and Unit Equipment
 - a. Installed:
 - 1) Manufacturer of fans
 - 2) Size
 - 3) Arrangement, discharge, class
 - 4) Motor, hp, volts, phase, full load amps
 - b. Design Conditions:
 - 1) CFM
 - 2) Static Pressure at Fan Discharge
 - 3) Motor hp
 - 4) Percent fresh air
 - 5) Fan rpm
 - 6) Fan motor bhp
 - c. Field Test Results:
 - 1) CFM
 - 2) Static pressure at fan discharge
 - 3) Fan rpm

- 4) Fan operating amps
- 5) Fan motor operating bhp
- 3. Velocity Tests for Main and Branch Ducts:
 - a. Duct size:
 - 1) Number of velocity readings
 - 2) Duct average velocity
 - 3) Total cfm
- 4. Supply and Return Air Grilles:
 - a. Outlet and inlet identification (location and number designation)
 - b. Manufacturer and type
 - c. Effective face area factor, core area or neck area
 - d. Required and resultant test velocities
 - e. Required and resultant test quantities in cfm
 - f. Deflector settings

1.4 QUALITY CONTROL

- A. Performance Requirements: Provide air supply devices complying with following:
 - 1. ADC Standard 1062R4, "Certification Rating and Test Manual"
 - 2. ASHRAE Standard 36B, "Method of Testing for Rating the Acoustic Performance of Air Control and Terminal Devices"
- B. Design Criteria
 - 1. Provide weather louvers and louvered penthouses:
 - a. Designed to conform to wind pressures and seismic requirements as specified in the Construction Specifications.
 - b. Designed to remain weatherproof when subjected to design wind pressures.
- C. Balancing and Testing Qualifications and Requirements
 - 1. Notification Point. Conduct balancing under supervision of qualified registered professional engineer or independent qualified agency which specializes in balancing of air systems. Submit name of registered professional engineer or balancing agency with their qualifying experience for acceptance by the Engineer.
 - 2. Conduct testing and balancing in presence of the Engineer or his authorized representative. Notify Engineer at least fourteen days in advance of proposed time of conducting this work so that mutually agreeable time can be arranged.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Basic materials for mechanical work are specified under Section 15050 - BASIC MATERIALS AND METHODS FOR MECHANICAL WORK.

2.2 MATERIALS

- A. Galvanized Steel
 - 1. Steel Sheets No. 14 Gauge or Lighter: ASTM A653, coating designation G 90.
 - 2. Steel Heavier Than No. 14 Gauge: ASTM A36, hot-dip galvanized after fabrication in accordance with ASTM A123, A153 and A386, as applicable.
- B. Steel Shapes, Angles and Rods
 - 1. For Ductwork Supports: Conform to ASTM A36 hot-dip galvanized in accordance with ASTM A123, Coating Designation G 90.
 - 2. Hardware for Supporting Ductwork: Galvanized in accordance with ASTM A153.
- C. Aluminum Extruded Shapes and Bars; Sheet and Plate: ASTM B221 and B209 alloys as required for finish and color indicated. Provide anodized or fluorocarbon finish as specified in the Construction Specifications, color as indicated.
- D. Screen Material: Maximum 1/2 inch mesh, 0.80 inch diameter aluminum wire, intercrimped bird screen.
- E. Sealants: Conform to requirements of Duct Manual, Chapter 4.

2.3 FABRICATION

- A. Ductwork
 - 1. Duct construction detail and metal gauges shall conform to SMACNA, Low Velocity Duct Construction Standards, referred to herein as the Duct Manual, except where necessary to increase gauges and supports for structural strength or other particular needs. Provide electrical isolation between dissimilar metals.
 - 2. Round Ductwork. Construct round ducts of galvanized steel in accordance with Duct Manual without turning vanes. Provide long radius sectional type elbows unless otherwise accepted.
 - 3. Rectangular Ductwork. Construct rectangular Ductwork in accordance with Duct Manual. Single thickness vanes will not be accepted. Construct fittings in accordance with Duct Manual. Exposed ductwork at ceiling of station platform areas shall have no longitudinal seams at bottom of duct or bottom corners. Also, transverse seams shall be drive slip with no raw edges at bottom of duct.
 - 4. No internal ductwork insulation will be accepted.
- B. Hangers and Supporting System: Construct hangers and supporting system in accordance with Duct Manual. For exposed station platform area ducts use strap hangers and round off ends of exposed straps.
- C. Duct Plenums: Field fabricate plenums with metal, gauges, reinforcing and construction in accordance with Duct Manual, except where otherwise shown on the Contract Drawings. Caulk joints.

D. Access Doors

1. Size access doors to plenums as indicated and construct in accordance with Duct Manual. Provide doors with a minimum of two hinges and two cam locking type latches, operable from both outside and inside.
2. Provide access doors in ducts, where required to gain access to resistance heaters, dampers, filters, coils or controls. Doors shall be gasketed and secured to duct with sheet metal screws. Construct in accordance with Duct Manual.

E. Ducts to be Embedded in Concrete: Fabricate ducts of galvanized steel minimum 1/4 inch thick, welded in accordance with AWS D1.1.

2.4 MANUFACTURED PRODUCTS

A. Instrument Test Holes. Provide instrument test holds with factor fabricated tight, non-corrosive screw cap and gasket. Cap shall be raised up through insulation.

B. Air Extractors. Provide air extractors for registers and grilles in accordance with Duct Manual.

C. Dampers

1. General: Provide blades for splitter, butterfly, and opposed blade dampers of the same metal as the ductwork and casings, except two gauge numbers heavier. Provide necessary ductwork accessories for fastening dampers to ductwork. Additionally, provide dampers having accessible operating mechanisms.
2. Manually Operated Volume Dampers and Splitters:
 - a. Provide dampers in ducts where indicated and where required for proper balancing of the various air systems. Dampers shall be fabricated in accordance with Duct Manual. Multiple blades shall be not over six inches wide and shall be gang operated. Provide factory fabricated dampers with non-metallic edges or coating.
 - b. Provide dampers with shafts and bearings so designed and mounted that the position of the damper within the duct shall be clearly indicated from the outside of the duct, and the exposed portion of the actuating mechanism of the damper can be manually operated without the use of special tools. On insulated ducts the damper operator and indicator shall extend beyond the insulation and covering.
3. Back Draft Dampers: Provide factory fabricated back draft dampers of the counter-balanced automatic construction. Blade linkage shall be located outside the air stream and shall be of galvanized steel. Axles shall be 3/16 inch diameter rod steel with a maximum panel width of 30 inches. Bearings shall be oil impregnated bronze. Provide blades with felt cushions to insure adequate sealing.

D. Air Outlets and Inlets: Unless otherwise specified herein or indicated, provide factory finishes for items exposed to public view of C54 or C55 medium statuary bronze as specified in the NAAMM Metal Finishes Manual, and equal to BHMA 613 finish; provide factory finishes for items not exposed to public view of ANSI F55.1, Color Chip 61. Protect outlets and inlets within seven feet of the floor level with a debris screen of heavy duty construction behind face through which a half-inch sphere will not pass and to resist physical abuse.

E. Registers

1. Supply Registers

- a. Supply registers shall consist of two sets of louvers. Front set of louvers shall be set parallel to the long dimension and be individually adjustable to any degree of deflection in the vertical plane. Rear set of louvers shall be set parallel to the short dimension and individually adjustable to any degree of deflection in the horizontal plane.
- b. A key operated opposed blade damper shall form an integral part of the register.
- c. Furnish and install as required for proper balancing, air volume extractor and controller, with key operated mechanism through face of register.

2. Return Registers: Return registers shall have a set of fixed blades, spaced at one-half inch center and set at 30° downward deflection. A key operated opposed blade damper shall form an integral part of the register.

3. Exhaust Registers: Exhaust registers shall have a front set of fixed blades parallel to the long dimension and set at 45° downward deflection. Rear shutoff multishutter blades shall be operated by a lever operated from the face of each register.

G. Air Grilles

1. Supply Grilles

- a. Provide supply grilles of adjustable four-way directional type having horizontal and vertical adjustment by means of individual bars or vanes spaced not over two-thirds inch apart.
- b. Provide frames of stamped or rolled steel sections having corner joints finished to provide neat, trim appearance. Additionally, provide supply grilles with air-tight felt, neoprene, or plastic sealing strips at edges to prevent leakage.
- c. Where indicated, provide factory-fabricated multiple-blade extractors, of air deflecting type with blades spaced not over two inches apart and install in accordance with manufacturer's recommendations.
- d. Exhaust and Return Grilles: Provide grilles constructed same as supply grilles, except equipped with single set of non-directional non-adjustable, non-see-thru face bars or vanes having same appearance as supply grilles.

H. Flexible Couplings

1. Provide flexible coupling where indicated and at points where ductwork connects to fans.
2. Provide flexible coupling with factory assembled flexible material bordered on each side with three inch wide galvanized steel edging, mechanically attached.
3. Provide the flexible portion of 32 ounce per square yard heavy fiberglass cloth, with fire resistant neoprene coating on both sides suitable for operating temperatures of 300°F. Provide material with a tensile strength not less than 450 psi.
4. The unclamped section of the flexible coupling between apparatus and ductwork shall not be less than 4 inches in length, crimped to form fluted corrugations.

5. Closely fit and securely clamp couplings to ductwork, fans and apparatus with heavy bolted clamps to permit easy removal.
6. Flexible couplings shall not be painted or used to correct misalignment.

I. Turning Vanes: Provide galvanized metal-extended single foil type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Install products in accordance with accepted working and shop drawings and in accordance with the equipment and material manufacturers' instruction.
2. Conform to NFPA No. 90A and the Duct Manual for installation of equipment, ductwork, dampers and accessories.
3. Ducts, unless otherwise accepted, shall conform to the dimensions indicated and shall be straight and smooth on the inside, with joints neatly finished. Hammer down edges and slips to leave a smooth interior duct finish. Make joints substantially airtight, and no dust marks from air leaks shall show at connections, grilles, register, or diffusers.
4. Anchor ducts securely to the structural slab or framing in the building. Construct and install ducts as to be completely free from vibration under all conditions of operation. Attach supports only to structural framing members and concrete slabs. Do not anchor supports to metal decking unless a means is provided and approved for preventing the anchor from puncturing the metal decking. Where supports are required between structural framing members, provide suitable intermediate metal framing. Items not shown in detail or described herein shall be as set forth in the Duct Manual.
5. During installation, seal duct sections to prevent entry of dust and dirt. Line ducts and plenum where indicated. Line and insulate ducts in accordance with Section 15250 - INSULATION.

B. Ductwork Expansion Joints

1. Where a ductwork expansion joint crosses structural contraction or expansion joints, make the crossing at 90° to the plane of the joint. Provide slip type expansion joints in ductwork at such crossings. The expansion joints shall provide adequate accommodation for linear movement at the structural joint. Make similar provision for expansion and contraction in the design and fabrication of the perforated galvanized steel inner lining.
2. Where ductwork is connected to concrete surfaces, provide the type of connection as indicated.

C. Flexible Couplings: Install flexible couplings at fans and air handling units as indicated. Wherever ductwork will be subjected to changes in length which must be absorbed in the ductwork, install either a slip joint as specified above or a flexible coupling.

D. Access Doors: Install access doors where indicated. Use insulated doors where duct or plenums are insulated or lined.

E. Instrument Test Holes

1. Install instrument test holes where required for balancing and testing. Cap shall be raised up through insulation.
2. Location of balancing holes shall be as directed by the Engineer.

F. Duct Sleeves and Prepared Openings

1. General: Provide duct sleeves for round ducts 15 inches diameter or less passing through floors, walls, ceilings, or roofs. Provide round ducts larger than 15 inches diameter and square and rectangular ducts passing through floors, ceilings, or roofs with prepared openings. Properly size and locate sleeves and openings. Provide duct sleeves and prepared openings for duct mains and duct branches. Branch take-off connections to grilles, registers and diffusers shall be in accordance with the Duct Manual.
2. Duct Sleeves: Fabricate duct sleeves from 20 gauge galvanized steel unless otherwise indicated. Where sleeves are installed in bearing walls or partitions, use black steel pipe, schedule 30, 40, or standard weight. Sleeve shall provide one inch clearance between the duct and the sleeve except at grilles, registers and diffusers.
3. Prepared Openings: Prepared openings shall provide one inch clearance between the duct and the opening except at grilles, registers and diffusers.
4. Closure Collar: Provide closure collar of galvanized steel not less than four inches wide on each side of walls or floors where sleeves or prepared openings are provided except where grilles, registers or diffusers are installed. Install the collar tight against the surface and fit snugly around the duct. Fabricate collars for round ducts 15 inches diameter or less from 20 gauge galvanized steel. Fabricate collars for square or rectangular ducts and for round ducts with minimum dimension over 15 inches from 18 gauge galvanized steel.
5. Packing: Pack the space between the sleeve or opening and the duct with commercial twisted asbestos yarn.

G. Dampers and Splitters

1. Install dampers and splitters so they can be adjusted at any time after completion of the work.
2. Install dampers, including automatic dampers, without strain or distortion of any part of the dampers. Moving parts shall move freely without binding. Caulk around frames of all dampers.
3. Adjusting rods and locking quadrants shall operate freely, between the fully open and closed positions. After adjustment, cut off projecting ends of rods flush with the operating quadrants for all volume dampers.

- H. Air Inlets and Outlets: Install air inlets and outlets in accordance with details indicated and in accordance with manufacturer's instructions. Make joints weather tight by use of gaskets or accepted sealant. Color of sealant, if used, shall match color of louver material unless otherwise accepted.

3.2 TESTING

- A. Test ductwork prior to placement of insulation. Test all ductwork with an internal air pressure test, pressure for such test shall be the maximum pressure designated in the Duct Manual for low velocity ducts. Test all joints and seams in the presence of the Engineer, while maintaining the above pressure. No leakage shall be noticeable through the senses of feeling or hearing at any joint or connection.

3.3 BALANCING AND TESTING

A. General

1. After completion of the installation of the air distribution systems and prior to acceptance, adjust air handling systems and appurtenances applicable to those systems and balance to deliver the air quantities as indicated. This includes all fans whether connected to sheet metal duct work or not.
2. Instruments required for air balance shall have been calibrated within a period of six months prior to use for the work under the Contract. Types, serial numbers, and dates of calibration reports shall be as hereinafter specified.

B. Air Balance

1. Perform air quantity measurements in main and branch ducts by pitot tube traverse of the entire cross-sectional area of the duct. Measure ducts having velocities of 1,000 fpm or more, by inclined manometers (draft gauge) magnehelic gauges. Perform air measurements required for ducts having velocities of less than 1,000 fpm with micro-manometers, hook gauges or similar low pressure instruments. Seal openings in ducts for pitot tube insertion with snap-in plugs after air balance is completed. Determine outlet and inlet air quantities by direct reading velocity meters in accordance with the register and grille manufacturer's recommendation.
2. Obtain total air quantities by adjustment of fan speeds or blade settings. Adjust branch duct air quantities by volume or splitter dampers. Permanently mark damper operators after air balance is complete so that they can be restored to their correct position if disturbed at any time. Maintain highest possible fan efficiency during balancing.
3. Volume dampers may be used to balance air quantities at outlets and inlets providing final adjustments do not produce objectionable sound levels or drafts. Air quantity adjustment by outlet deflectors, grids, or air scoops will not be permitted.

- C. Test Reports of Air Balancing: Record and submit to the Engineer, for evaluation and acceptance reports complying with requirements of this Section.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 16050

BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies basic materials and methods for electrical work.
- B.** Related Work: Refer to Section 16450-Grounding, for proper installation of components identified in this section. The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Determine interfaces and coordinate electrical work with utility company or the Authority where power source is the Authority's.
 - 2. Determine interfaces and coordinate with work completed, progressing, or to be performed under other sections of these Specifications or by other contractors. Make indicated connections to previously completed work. Where future connections to or extensions of the work are indicated, make safe and convenient provisions for such future connections and extensions.
 - 3. Where indicated, take possession of, maintain, and operate as required any electrical plant and equipment left in place by others. Where indicated, leave temporary and interim electrical work, plant and equipment in place for maintenance and operation by others.
- C.** Related requirements are included in, but not limited to, the following sections.
 - 1. Section 13347 - PREFABRICATED WORK PLATFORMS

1.2 REFERENCES

- A.** Comply with applicable requirements of the following:
 - 1. National Electrical Code
 - 2. Massachusetts Electrical Code

1.3 SUBMITTALS

- A.** Submit shop drawings for review showing fabricated work being furnished and installed under these Specifications. Submit such drawings prior to fabrication and within ample time to prevent delays in the work.
- B.** Submit verified test results to the Engineer promptly upon completion of test.
- C.** Before installation of the wire and cable, submit the following information for each type and size of wire and cable for review:
 - 1. Manufacturer of the wire and cable.

2. Number and size of strands composing each conductor.
3. Conductor insulation composition and thickness in mils.
4. Average overall diameter of finished wire and cable.
5. Minimum insulation resistance in megohms per 1000 feet at 20°C ambient.
6. Jacket composition (if any) and thickness in mils.
7. Total number of conductors per cable.
8. Shield material (if any) and thickness.
9. Conductor resistance and reactance in ohms per 1000 feet at 20°C ambient.
10. Conductor ampacity at 20°C ambient.
11. Coordinate lighting and power for prefabricated work platforms with the manufacturer's design of the work platforms. Indicate coordination on the shop drawing submittals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Furnish all items of the materials, design, sizes, and ratings shown on the Contract Drawings and herein specified.
- B. Furnish materials and equipment bearing evidence of UL listing where UL standards exist and such product listing is available.
- C. Methods of fabrication, assembly and installation are optional unless otherwise specifically indicated.
- D. Provide products that are free from defects impairing performance, durability, or appearance, and of the commercial quality best suited for the purpose shown on the Contract Drawings or specified herein.
- E. Steel conduit and accessories specified to be zinc coated: Hot-dipped galvanized after fabrication in accordance with ASTM A286.
- F. Conform to applicable requirements of Insulation Power Cable Engineers' Association (IPCEA).

2.2 RIGID GALVANIZED STEEL CONDUIT AND ACCESSORIES

- A. Conduit, couplings, elbows, bends, and nipples: ANSI C80.1 and UL 6, with each length bearing manufacturer's stamp and UL label.
- B. Method used to determine the thickness of zinc coating: The Referee Test included in the appendix to ANSI C80.1.
- C. Fittings and Accessories:
 1. Galvanized steel or malleable iron, ANSI C80.4.
 2. Provide separable watertight hub fittings with a gasket, separate nylon insulated throat and a case hardened locknut.
 3. Bushings: Nylon insulated metallic and grounding type.

4. Furnish conduit straps, clamps, and clamp backs made of galvanized malleable iron.

D. PVC Coated Conduit

1. NEMA Standard No. RN1, Coating Type A-40.
2. Thread protectors installed on both ends of conduit for shipment and handling, couplings packaged separately.

- E.** Almost without exception, in any below grade structures, the MBTA requires the use of RGS conduit.

- F.** All conduits penetrating floors and ceilings must have brass labels for ease of tracing circuits.

- G.** Buried conduits cannot have buried pull boxes.

2.3 LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT AND FITTINGS

- A.** Furnish conduit consisting of a core of flexible galvanized steel with an extruded liquid-tight plastic or neoprene jacket overall. Jacket shall be moisture and oil-proof, capable of conforming to the minimum radius bends of flexible conduit without cracking.

- B.** Furnish conduits with a continuous copper bonding conductor spiral wound between the convolutions, as required by NEC, and as indicated.

- C.** Fittings: UL Standard 514, cadmium or zinc-coated.

2.4 PVC ELECTRICAL CONDUIT AND FITTINGS (ONLY FOR OUTDOOR USE)

- A.** Heavy wall, high impact strength, rigid PVC conforming to the requirements of EPC-40-PVC conduit of NEMA TC2 and fittings for EPC-40-PVC conduit of NEMA TC3.

- B.** UL listed in accordance with Article 347 of the NEC for underground and exposed use.

- C.** Flammability rated as self-extinguishing, and having the following minimum properties:

1. Tensile strength, ASTM D638 at 78°F: 6,000 psi.
2. Flexural strength, ASTM D790: 11,000 psi.
3. Compressive strength, ASTM D695: 8,500 psi.
4. Hardness (Durometer D), ASTM D2240: 77.
5. Water absorption, percent maximum, in 24 hours at 72°F. ASTM D570: 0.03.
6. Dielectric strength, volts per mil, ASTM D149: 1,100.
7. Thermal conductivity: 1.3 BTU per square foot per degree F per inch.

2.5 CONDUIT EXPANSION FITTINGS

- A.** Fabricate from material similar to the type of conduit with which they are to be used.

- B.** Include a factory installed packing ring, designed to prevent the entrance of moisture, and a pressure ring.

- C. Also include a grounding ring or a grounding conductor for metallic expansion couplings.

2.6 MULTIPLE PIPE HANGERS (TRAPEZE TYPE)

- A. Fabricate of two or more steel hanger rods, a steel horizontal member and all U-bolts, clamps, and other attachments necessary for securing hanger rods and conduits.
- B. Hanger Rod: Not smaller than 3/8 inch diameter, threaded either full length or for a sufficient distance at each end to permit at least 1-1/2 inches of adjustment.
- C. Horizontal Member
 - 1. Standard structural steel shapes such as angles or channels, 1-1/2 by 1-1/2 or 1-5/8 by 1-5/8 inches, 12 gauge, cold-formed, lipped channel, and designed to accept special spring-held hardened steel nuts for securing hanger rods and other attachments.
 - 2. Two or more channels may be welded together to form horizontal members of greater strength than single channels.
 - 3. Galvanize after fabrication.
- D. Design
 - 1. Capable of supporting a load equal to the sum of the weights of the conduits and wires, the weight of the hanger itself, plus 200 pounds.
 - 2. The stress at the root of the thread of the hanger rods; not more than 9,475 psi at design load.
 - 3. Size the horizontal member such that the maximum stress will be not more than 12,650 psi at design load.

2.7 INSERTS

- A. Channel Inserts. Fabricate from not less than 12 gauge steel channel having an overall size of 1-1/2 by 1-1/2 or 1-5/8 by 1-5/8 inches with continuous 7/8 inch wide slot, in lengths as indicated. Galvanize after fabrication.
- B. Channel Inserts for Embedding in Concrete
 - 1. Fabricate from channels having a solid base.
 - 2. Weld concrete anchors to the channel during fabrication and before coating.
 - 3. Galvanize after fabrication
 - 4. Provide assemblies with a minimum pull-out load rating of 4,500 pounds per linear foot uniformly distributed.
 - 5. Furnish all channel inserts for installation embedded in concrete with the channel interior completely filled with styrofoam to prevent seepage of concrete into the channel during installation.
- C. Channel Inserts for Surface Mounting
 - 1. Fabricate from channel having 3/8 inch by 3-inch slots on 4-inch centers in the base.

2. Galvanize inserts for surface mounting on concrete surfaces or for installation in damp or wet areas.

D. Spot Inserts for Embedding in Concrete

1. Steel, galvanized after fabrication
2. Designed for a maximum loading of 800 pounds with safety factor of three.
3. Knockout openings to accommodate either square or rectangular nuts.

2.8 SURFACE METAL RACEWAYS AND FITTINGS

- A.** ANSI/UL 5 and the NEC.

2.9 OUTLET, JUNCTION AND PULL BOXES

- A.** Conform to NEC Article 370. Electrical boxes shall conform to UL-50, "Standard for Electrical Cabinets and Boxes", and UL-514, "Standard for Electrical Outlet Boxes and Fittings".
- B.** Provide electrical boxes of the material, finish, type and size indicated and required for the location, kind of service, number of wires, and function. Boxes shall have mounting holes retapped for 10-24 machine screws.
- C.** Provide boxes complete with accessible covers designed for quick removal and suitable for the purpose for which they will be used, except that boxes in which or on which no devices or fixtures are to be installed, shall be equipped with flat or raised blank covers as required. All ceiling fixture outlet boxes shall be equipped with 3/8-inch boltless fixture studs.
- D.** Boxes not over 100 cubic inches in size shall be cast. Boxes over 100 cubic inches in size shall conform to the requirements for cabinets.
- E.** Covers: Same thickness as boxes and secured in position by means of No. 10-24 stainless steel machine screws. Arrange covers to be readily and conveniently removed.
- F.** Coat junction boxes inside and outside to prevent oxidation. Where outlet boxes are used as junction boxes they shall be cast aluminum and not be smaller than 4 inches square by 1-1/2 inches deep. Provide such boxes with flat blank covers.
- G.** Outlet Boxes: Cast aluminum, not be smaller than 4 inches square by 2-1/8 inches deep.
- H.** Concealed Switch Boxes: Cast aluminum, not less than 4 inches square by 1-1/2 inches deep for two devices unless otherwise indicated. Provide covers with rectangular openings of proper size and shape. Furnish and install special boxes required to suit the kind of service and location requirements, as indicated, and as may be directed by the Engineer.
- I.** Cast metal boxes shall be of aluminum alloy, with compatible conduit fittings.
- J.** Boxes for exposed switches and receptacles: Cast metal, FS and FD Types.
- K.** Furnish brackets, supports, hangers, fittings, bonding jumpers and all other accessories required.

- L. Provide neoprene gaskets 1/8 inch thick with boxes subjected to weather, and as directed by the Engineer.
- M. Grounding. Provide each box to which a lighting fixture or receptacle is to be attached with a grounding terminal.
 - 1. Grounding Terminal: Either a green-colored washer-in-head machine screw not smaller than No. 10-32 in a drilled and tapped hole in the back of the box, or a grounding bushing with green-colored machine screw terminal attached to one of the conduits.
 - 2. Provide suitable grounding terminals in motor connection boxes.
 - 3. Install grounding jumpers as specified in Section 16450 - GROUNDING.
- N. Junction and pull boxes must be surface mounted and not buried.

2.10 CABLE TRAYS

- A. General. Provide cable tray systems conforming to the requirements of NEMA VE1, except for modifications indicated. Cable tray system shall be designed to withstand Seismic Zone 3 earthquake.
- B. Cable Tray System Components: Hot-dipped, galvanized steel with PVC coating; or, stainless steel.
 - 1. Hot-dipped galvanized after fabrication in accordance with ASTM A 386. PVC coating of 20 mils minimum having Shore A durometer hardness of 75.
 - 2. Stainless steel as indicated.
- C. Dimensions
 - 1. Straight sections and fittings: Inside clear width as indicated, measured between the rails. Overall width not exceeding inside depth by more than 2-1/2 inches. Inside nominal depth: 4 inches. Overall tray depth not exceeding inside depth by more than 3/4 inch.
 - 2. Rung spacing for ladder-type straight sections: 9 inches on centers maximum.
- D. Fabrication
 - 1. Straight sections and fittings consisting of stiffened channel rungs located between channel-shaped side rails having outward projecting flanges.
 - 2. Straight-section side rails shall have a top flange at least 1-1/4 inches wide and minimum 3/8-inch vertical stiffening lip.
 - 3. Rungs shall be positioned to provide a flat, cable support surface at least 1-1/8 inches wide, excluding corner radii, and shall be 0.060 inch thick. MIG-weld rungs to side rails and clean welds.
- E. Test Requirements
 - 1. Cable tray system shall be capable of supporting a total cable load of 55 pounds per linear foot on a maximum span of 8 feet with a safety factor of 2 based on the destructive load, regardless of the type of splice plates or type of span, when tested in accordance with load test procedure described in NEMA VE1.

2. Straight sections and fittings shall not permanently deform under a 202 pound static concentrated load applied vertically along a 4-inch length for both of the following conditions:
 - a. Load applied to one side rail of tray section having specified cable load and support spacing. Load shall be applied at midpoint between supports over a splice connection.
 - b. Load applied to one rung of empty tray section having specified support spacing. Load shall be located at midpoint between side rails and supports. Cable tray support shall be capable of supporting 0.625 of the sum of the total load on both spans adjacent to support with safety factor of 2.

2.11 CABLE TRAY CHANNEL SUPPORTS

- A. Fabricate from minimum 12 gauge steel channel, 1-5/8-by-1-5/8 inches, with a continuous 7/8-inch wide slot. Hot-dipped galvanized.
- B. Hardware, Fittings, and Brackets: Zinc or cadmium coated.
- C. Design assembled supports, fittings, brackets, and hardware to carry the loads shown on the Contract Drawings with a factor of safety of three or greater.
- D. Supports shall provide at least 1-1/8 inch bearing length for each rail and shall have provision for tray hold-down clamps and fasteners.

2.12 UNDERFLOOR DUCTS, TRENCHES, AND FITTINGS

- A. Manufacture ducts and trenches from 14 gauge galvanized steel, furnished with a UL listed corrosion-resistant coating.
- B. Design fittings for use with the duct or trench to form a complete underfloor raceway system.
- C. Ducts for Power Service: 3-1/8 inches wide by a minimum 1-1/4 inches deep, or 6 inches wide by 1-1/2 inches deep, as indicated, with threaded 2 inch IPS inserts spaced on 2-foot centers.
- D. Ducts for Low Voltage, Communication, or Signal Use; Six inches wide by 1-1/2 inches deep with 2-inch IPS inserts spaced on 2-inch centers.
- E. Floor Trenches: 18 inches wide by 4 inches deep with 5/16-inch thick floor plate. Cover plates of maximum length, as indicated.
- F. Equip inserts with caps and countersunk-head floor marking screws.
- G. Size junction boxes for underfloor ducts to accommodate the ducts, and finish similar to the duct.
- H. Provide approximate tile holders of a depth as required for installation of the floor finish.
- I. Provide service fittings where required, complete with adapters and locking nipples suitable for use with the duct.

2.13 WIRE AND CABLE (600 VOLT)

- A. Conductors: Conform to the requirements of the NEC.
1. Feeder and Branch Circuit Conductors: Soft-drawn copper.
 2. Control Circuits: Soft-drawn copper.
 3. Conductor Sizes: Standard American Wire gauge sizes. Conductors No. 10 and smaller, solid copper; No. 8 and larger, stranded copper.
 4. Minimum AWG sizes unless otherwise indicated:
 - a. No. 12 for branch circuits.
 - b. No. 14 for control wire and fixture wire
 - c. No. 16 for low voltage circuit and indication wire.
- B. Wire and Cable 600 volts and Below Installed Raceways: Single conductor, NEC type XHHW, conforming to requirements of NEMA WC 7, or THWN.
- C. Fixture Wire: Type AF single conductor, rated for 150°C conductor temperature, 300 volts.
- D. Color Coding of Conductors
1. Color code supply cables and branch circuit conductors throughout the secondary alternating current wiring system as follows:

Conductor	208/120 Volts	480/277 Volts
Phase A	Black	Orange
Phase B	Blue	Yellow
Phase C	Red	Brown
Neutral	White	Off-White
Ground	Green	Green

2. Color code single-conductor wires as follows:
 - a. 480/277 volt circuits, blue with yellow tracer.
 - b. 120/208 volt circuits, yellow with blue tracer.
 3. Branch circuit phase conductors No. 10 and smaller and all neutral and equipment conductors: Solid color insulation or solid color coating.
 4. Solid color coatings and tracers: A strongly adherent paint or dye not injurious to the insulation and which will not be obliterated by pulling into a conduit or raceway.
 5. On-site coloring of ends of conductor may be permitted by the Engineer upon receipt of satisfactory evidence that the Contractor is unable to order color-coded wire and cable as specified. Provide certification from the cable manufacturer that the paint or dye proposed for field application is non-injurious to the insulation. Colored tape may be used to mark the ends of conductors in lieu of paint or dye.
- E. Identification Tags
1. Provide waterproof identification tags of brass, aluminum, plastic, or pressure-sensitive moisture-resistant labels designed for fastening to cables, feeders, and power circuits in vaults, pull boxes, manholes, and switchboard rooms and at all terminations of cable or wire.

2. Stamp or print tags or labels to correspond with markings on the Contract Drawings or accepted Shop Drawings, or mark so that feeder, cable or conductor may be readily identified. Tags on conductors at switches, receptacles, motor control panels, wireways, and junction boxes shall bear the circuit number of the conductor as it appears in the circuit directory. Mark conductors in motor control panels with the terminal number.
3. If suspended type tags are provided, design tie tags with slip-free plastic cable lacing unit or design for attachment by nylon bundling straps.

F. Cable Supports and Fasteners: Design for use with channel inserts.

G. Conductor Bundling Straps

1. Formed from self-extinguishing nylon having a temperature range of minus 65°F to plus 250°F.
2. Equip each strap with a locking hub or head with a stainless steel locking barb on one end and a taper on the other end.
3. Make wire and cable ties for installation outdoors and in exposed locations of ultraviolet resistant nylon material.

H. Splice and Terminal Connectors

1. Design termination fittings for use with the cable furnished, NEMA Standard, and UL approved.
2. Termination and splice fittings for No. 10 and smaller conductors: Screw on, spring pressure-type copper connectors with nonflammable, self-extinguishing insulation of temperature rating equal to that of cable being connected. Terminals to provide a metal insulation grip on the conductor for stain relief.
3. Termination and splice fittings for No. 8 and larger conductors: Tool-applied compression connectors of material and design compatible with the conductors for which they are used.
4. Terminal connectors for conductors Size No. 4/0 and larger: Long-barrel, double compression type, and furnished with two bolting holes in the pad.

I. Insulating Material for Splices and Terminations

1. Of the type approved by the Engineer for the particular use, location and voltage, 3/4 inch nominal width.
2. Plastic electrical insulating tape for general use: Vinyl plastic with rubber-based pressure-sensitive adhesive. Pliable at temperature of minus 18°C to 105°C. When tested in accordance with ASTM D 3005, the tape shall have the following minimum properties:
 - a. Thickness: 7 mils.
 - b. Breaking Strength: 15 pounds per inch.
 - c. Elongation: 200%.
 - d. Dielectric Strength: 10,000 volts/mil
 - e. Insulation Resistance (Direct method of electrolytic corrosion): 1,000,000 megohms.
3. Rubber electrical insulating tape for protective overwrapping: Silicone rubber with a silicone pressure-sensitive adhesive. When tested in accordance with ASTM D1000, the tape shall have the following minimum properties:
 - a. Thickness: 15 mils.
 - b. Tensile Strength: 11 pounds per inch.

- c. Elongation: 525%.
 - d. Dielectric Strength: 13,000 volts
 - e. Insulation Resistance (Indirect Method of Electrolytic corrosion): 1,000,000 megohms.
4. Arcproof Tape: Flexible, conformable organic fabric, coated one side with a flame-retardant flexible elastomer-self-extinguishing, with the following minimum properties:
- a. Thickness, ASTM D1000: 55 mils.
 - b. Tensile strength, ASTM D1682; 50 pounds per inch.
 - c. Thermal conductivity, ASTM D1518; 0.478 btu/hour/square foot/degrees F.
 - d. Electrical Arc Resistance: Withstand 200 ampere arc for 40 seconds.
5. Mark each tape package to indicate shelf-life expiration date.
6. Glass Cloth Electrical Insulating Tape (for use with arcproof tape): Woven glass fabric; when tested in accordance with ASTM D1000, the tape shall have the following minimum properties:
- a. Thickness: 7 mils
 - b. Breaking Strength: 170 pounds per inch.
 - c. Elongation: 5%.
 - d. Dielectric Breakdown: 2,500 volts.
 - e. Insulation Resistance (Indirect Method of Electrolytic Corrosion): 5,000 megohms.

2.14 WIRING DEVICES

- A. General. Wiring devices include switches, receptacles and special outlets installed in raceway or conduit boxes, complete with cover plates.
- B. Switches
- 1. AC tumbler-toggle switches: Meeting minimum requirements of UL 20 and further requirements herein specified and of specification grade, heavy duty, of the type indicated.
 - 2. Provide switches that operate in any position and are fully enclosed with entire body and cover of molded phenolic, urea or melamine. Do not use fiber, paper or similar insulating material for body or cover.
 - 3. Equip switches with metal mounting yoke with plaster ears, insulated from the mechanism and fastened to the switch body by bolts, screws, rivets or other substantial means that meet test requirements.
 - 4. Provide a green-colored equipment grounding screw on the yoke.
 - 5. Provide the section of the yoke normally intended to bear on the surface outside the box with a minimum over-all dimension of 3/4 inch, measured at right angles to the longitudinal axis of the yoke.
 - 6. Make switch contacts between silver or silver alloys.
 - 7. Switches shall be back and side wired with terminals of screw or combination screw-clamp type.
 - 8. Terminal Screws: No. 8 or larger, captive or terminal type.
 - 9. Provide access holes for back wiring.
 - 10. Wiring terminals capable of receiving and holding proper wire sizes as shown below:

Switch Rating	Wire Size, AWG No.
---------------	--------------------

20 amperes	12 and 14
30 amperes	10

- C. Wall switches: Tumbler type, totally enclosed, heavy duty, in accordance with NEMA WD 1.
- D. Switches for use on incandescent or fluorescent lighting circuits: Fully rated 20 amperes at 120 or 277 volts, as indicated. Actual connected lamp wattage not to exceed the following:

Switch Rating at 120- 277 Volts	Maximum Wattage Allowed	
	120 Volts	277 Volts
20 amperes	1,400	3,000

- E. Switches controlling outlets other than lighting, such as motors less than 1/4 horsepower may be specification grade, flush type, AC - DC, T-rated 20 ampere, 125 volts. Switches controlling straight resistance loads may be snap switches as specified herein, of the proper rating up to 30 amperes at 120-277 volts.
- F. Provide ac 120-277 volt snap switches capable of withstanding tests as outlined in NEMA WD 1, Paragraphs WD 1-2.04, WD 1-2.05A, WD 1-2.05C, WD 1-2.05E2, WD 1-2.05F2, and WD 1-2.05G. If requested by the Engineer, submit satisfactory evidence that the types of switches proposed have satisfactorily withstood these tests.

2.15 RECEPTACLES AND PLUGS

- A. Configuration and requirements for connector and outlet receptacles; UL 498 and NEMA WD 1 for heavy duty general use type.
- B. Receptacles: Fire-resistant nonabsorptive, hotmolded phenolic composition or equal bodies and bases with metal plaster ears integral with supporting member.
- C. Type: Flush type, except where otherwise indicated.
1. Wall receptacles; Single or duplex as shown on the Contract Drawings.
 2. Provide receptacles and plugs (caps) with light-colored terminal facilities for neutral connections, amber or brass colored for phase conductor connections, and green-colored hexagonal machine screws for the equipment grounding conductor or connections.
 3. All contracts of the receptacles, including the grounding contract: Double grip bronze type with spring steel backup clips so that both sides of each male prong of the plug will be in firm contact.
 4. Provide all receptacles with self-grounding clip or mounting strap screws.
 5. Ground fault circuit interrupter duplex receptacles shall be 120 volt, 60 Hz, 15 ampere with built-in test, reset buttons, and ground fault tripped indication. They shall interrupt the circuit within 1/30th of a second on a 5 milliampere earth leakage current. They shall be designed for end of run installation or with provisions for feeding through to protect other outlets on the circuit. Maximum circuit capacity for the latter shall be 20 amperes. The receptacles shall be furnished with necessary wire connectors, clips, mounting scores and instruction.

D. Clock Receptacles

1. Receptacles for clocks are not required for clocks operating on less than fifty volts, and flush-mounted clocks (inserted type).
2. Provide receptacles for clocks conforming to NEMA 5-15R, recessed so that male cap will be flush with the wall to permit the clock to cover the outlet.
3. Provide plates, including finishes, as specified for cover plates, adapted to the recessed receptacles and with substantial hooks to support the clocks.
4. Receptacles for surface-mounted clocks connected to the building 120-volt electrical system: As indicated.
5. Where clock receptacles are shown on the Contract Drawings or specified, furnish the grounded type and provide with a ground jumper.

2.16 COVER PLATES

- A. Provide cover plates for each switch, receptacle, and special purpose outlet.
- B. Use multi-gang plates for multi-gang boxes.
- C. Unless otherwise indicated, use cover plates conforming to FS W-P-455.
- D. Provide and install cover plates of brushed stainless steel in ancillary spaces, mechanical rooms, fan rooms, wire closets, AC switchboard rooms, traction substations, and all unfinished areas.
- E. In public areas provide cover plates fabricated of corrosion-resistant steel, 18% chromium, 8% nickel with baked porcelain enamel bronze finish.
- F. For special purpose outlets commercially produced using special material, configuration, and size, use plate of brushed stainless steel and of a design for the particular application.
- G. Where plates of material and finish herein specified are not available commercially for these special purpose outlets, plates commercially available and suitable for enameling to match adjacent surface will be acceptable.
- H. Use stainless steel cover plates of 0.040 thickness for flush devices.

2.17 DISCONNECTION DEVICES

- A. Safety Switch Type Disconnecting Devices: Enclosed, conforming to UL Standards and the following:
 1. Motor Circuit Switches (600 Volts AC):
 - a. Furnish motor circuits with a separately mounted disconnect switch where required within sight of the motor.
 - b. Switch: HP rated, UL listed, quick make quick break, full cover interlock and indicator handle, conforming to FS W-S-865 for heavy duty switches.
 - c. Enclosure Type: As indicated.

- d. Furnished handle mechanism with continuous engagement of the switch handle whether the door is open or closed, and is pad-lockable in the OFF and ON position.
- 2. Heavy Duty Safety Switches (240 Volts AC):
 - a. Furnish heavy-duty safety switches having electrical characteristics, ratings, and modifications indicated.
 - b. Furnish switches with NEMA 12 General Purpose Enclosures, unless otherwise indicated, and with metal nameplates, front cover mounted, containing a permanent record of switch type, catalog number, and HP ratings.
 - c. Furnish handle with visible blades; reinforced fuse clips; nontearable, positive, quick make-quick break mechanism, and which is pad-lockable in the OFF and ON position.
 - d. Furnish switches meeting NEMA KS 1 requirements.
- 3. Heavy Duty Safety Switches (600 Volts AC):
 - a. Furnish heavy-duty safety switches having electrical characteristics, ratings, and modifications shown on the Contract Drawings.
 - b. Furnish all switches with NEMA 12 General Purpose Enclosures, unless otherwise indicated, meeting NEMA KS 1 requirements.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all items in their proper locations as shown on the Contract Drawings, rigid and secure, plumb and level, and in true alignment with related and adjoining work. Do not weld electrical materials for attachment or support.
- B. Furnish anchor bolts and anchorage items as required, and field check to ensure proper alignment and location. Provide templates, layout drawings, and supervision at the job site to ensure correct placing of anchorage items in concrete. Check embedded items for correctness of location and detail before concrete is placed.
- C. Install supporting members, fastenings, framing, hangers, bracing, brackets, straps, bolts and angles as required to set and connect rigidly the work.
- D. Control erection tolerance requirements to not impair the strength, safety, serviceability, or appearance of the installations, as approved by the Engineer. Determine exact location of conduit. Route all conduit parallel to building lines.
- E. The trade size, type and general routing and location of conduits, raceways, and boxes shall be as indicated.
- F. Install exposed conduit so as to avoid conflicts with other work. Install horizontal raceway close to the ceiling or ceiling beams, and above water or other piping whenever possible.
- G. Install individual conductors in conduits, raceways, cable trays, ducts, and trenches and multiple-conductor sheathed cables as shown on the Contract Drawings to complete the wiring systems.

- H. Install switches, receptacles, special purpose outlets, and cover plates complete in a neat manner in accordance with the NEC and local electrical codes.

3.2 CONDUIT AND FITTINGS

A. Metallic Electrical Conduit

1. Install metallic conduit in accordance with the NEC and as indicated. Prevent concrete and other materials from obstructing the conduit. Pack all outlet, pull and junction boxes with paper prior to pouring concrete ends of embedded conduit. Do not use conduit smaller than 3/4-inch diameter.
2. Make all conduit bends in accordance with the NEC, with not more than 3 bends per run. Where more than 3 bends are required in a particular run, install pull boxes as required to facilitate pulling conductors.
3. Unless otherwise indicated, terminate metallic conduit installed for future extension with flush couplings set to finished floor level.
4. Provide metallic numbering tags indicating the conduit number on the end of conduit. Identify train control and communication conduit as indicated.
5. Properly support conduit to be embedded to maintain correct location and spacing during concreting operations. If necessary, provide suitable metal supports for this purpose.
6. Install conduit so that any moisture collecting in the conduit will be drained to the nearest outlet or pull box.
7. Whenever exposed or buried conduit passes through an expansion or contraction joint in the structure, install the conduit at right angles to the joint, and provide an approved conduit expansion joint at the joint. Paint the conduit with an approved bituminous compound for one foot on each side of the expansion couplings.
8. Provide expansion joints in conduit runs where required to compensate for thermal expansion.
9. Rod and swab embedded conduit after installation to remove foreign matter, which may have worked in at the joints. If obstructions are encountered which cannot be removed, or if any conditions exist which may result in damage to wires and cables pulled through the conduit, install new conduit at no additional expense to the Authority.
10. After the conduit has been rodded and swabbed, repack boxes and protect conduit ends to prevent any foreign material from entering the conduit.
11. Where metallic conduit is exposed to different temperatures, seal the conduit to prevent condensation and passage of air from one area to the other.
12. Use only conduits that are electrically and mechanically continuous and connect to the structure ground system. Secure continuous ground by bonding where required.
13. Apply conductive antisieze compound to the threads of threaded rigid conduit joints. Do not use compounds containing lead. Terminate the conduit in appropriate boxes at all motors, switches, outlets, and junction points.
14. When field cutting of conduit is required, thread and ream the conduit to remove any rough edges. Where a conduit enters a box or other fitting, provide a bushing to protect the wire from abrasion. Provide insulation type bushings and double locknuts on ends of rigid conduits terminating at steel boxes, panelboards, cabinets, motor starting equipment, and similar enclosures.
15. Support individual horizontal conduits not larger than 1-1/2 inches diameter by means of one-hole pipe straps with back spacers or individual pipe hangers.
16. Space conduits installed against concrete surfaces away from the surface by clamp backs or other approved means.

17. Support individual horizontal conduits larger than 1-1/2 inches diameter by individual pipe hangers.
18. In dry locations, spring steel fasteners, clips, or clamps specifically designed for supporting exposed single conduits may be used in lieu of pipe straps or pipe hangers.
19. Hanger rods used in connection with spring steel fasteners, clips, and clamps shall be either 1/4-inch diameter galvanized steel rods or, if concealed above a suspended ceiling, galvanized perforated steel strapping. Do not use wire for support of conduit.
20. Support parallel conduits at the same elevation on multiple conduit hangers or channel inserts. Secure each conduit to the pipe hanger or channel insert member by a U-bolt, one-hole strap, or other specially designed and approved fastener suitable for use with the pipe hangers or channel inserts.
21. Space supports not over 10 feet on centers for vertical conduits spanning open areas. Securely anchor conduit at each end and run so as not to interfere with the installation and operation of equipment at the location.
22. Support conduits and raceways above suspended ceilings from either the floor construction above or from the main ceiling support members, using the applicable method specified herein.
23. Install liquid-tight flexible metal conduit so that liquids tend to run off the surface and not drain toward fittings. Provide sufficient slack to reduce the effects of vibration. Running threads are not acceptable. Where necessary for connecting conduits, use right and left hand couplings.

B. Non-Metallic Electrical Conduit

1. Non-metallic electrical conduit includes polyvinyl chloride (PVC) and asbestos cement conduit.
2. Cap or plug the ends of embedded conduit to prevent concrete and other materials from obstructing the conduit.
3. Sandpaper joints in PVC conduit to remove all burrs, clean and dry the joints, and brush with a solvent cement acceptable to the manufacturer before installing.
4. Properly support conduits to maintain the correct location and spacing during concreting operations and, if necessary, provide suitable plastic supports and spacers for this purpose.
5. Wherever buried non-metallic conduit passes through an expansion or contraction joint, or where required to compensate for thermal expansion and contraction, provide a conduit expansion joint. Install the conduit to cross the joint at right angles. In areas of floating slabs, install horizontal runs of conduit beneath the floating slab. Conduit shall pass through the floating slab only where required to terminate in a vertical direction as shown on the Contract Drawings.

C. Pull Wires

1. Use nylon pull wires of tensile strength not less than 240 pounds in each conduit and duct, leave pull wires in ducts and conduit after cleaning.
2. No splices in pull wire will be allowed.
3. Leave ample slack length at each end of pull wire.

D. Filling of Openings. Wherever slots, sleeves, or other openings are provided in floors or walls for the passage of raceways, including bus ducts, fill such openings as follows:

1. Use fire-resistive filling material for openings similar to the material of the floor, wall or ceiling being penetrated, and finish to prevent passage of water, smoke, and fumes.
2. Where conduits passing through openings are exposed in finished rooms, use filling material that matches, and is flush with, the adjoining finished floor, ceiling or wall.

3.3 INSERTS

- A. Channel Inserts. Install embedded channel inserts with the slotted face flush with the finished concrete surface.
- B. Spot Inserts
 1. Install with the insert face flush with the finished concrete surface, firmly embedded, with no evidence of movement.
 2. Test selected inserts, as required by the Engineer, by suspension of 800 pounds of weight from the insert. If there is evidence of failure, replace the inserts in a manner satisfactory to the Engineer.

3.4 SURFACE METAL RACEWAYS

- A. Securely ground surface metal raceways to outlet boxes or to backplates and fixtures by means of bolts, screws or other approved means and as specified in Section 16450 - GROUNDING.
- B. Install surface metal raceways where indicated, in accordance with the NEC. Use fittings and accessories designed for the raceway.

3.5 OUTLET, JUNCTION AND PULL BOXES

- A. Outlet Boxes
 1. Unless otherwise indicated, flush mount outlet boxes with the front edges of the boxes or plaster covers attached thereto flush with the finished wall or ceiling.
 2. Mount boxes so that the long axis of the devices will be vertical, unless otherwise indicated.
 3. Locate conduit boxes and conduit box knockouts so as not to interfere with the reinforcing steel.
 4. Unless otherwise specified, provide boxes in plastered walls and ceilings with plaster covers. Do not install these covers until the finish plaster line is determined for the particular location.
 5. The mounting height indicated for a wall-mounted outlet box shall be construed to mean the height from the finished floor to the horizontal centerline of the cover plate.
 6. Mount outlet boxes for switches and receptacles located on columns and pilasters so as not to interfere with installation of partitions.
 7. Install boxes located near doors on the lock sides, even where the symbols appear on the hinge sides on the Contract Drawings, unless other locations are approved by the Engineer.
- B. Junction and Pull Boxes

1. Install so that covers are readily accessible after completion of the installation.
2. Do not install boxes above suspended ceilings, except where the ceiling is of the removable type or where definite provisions are made for access to each box.

C. Boxes Set in Concrete

1. Adequately support boxes to prevent movement during placement of concrete.
2. Unused nailing holes or other holes in the side or bottom of the boxes will not be permitted.
3. After installation, clean boxes placed in concrete.

3.6 CABLE TRAYS

- A.** Install as shown on the Contract Drawings and in accordance with NEC Article 318 using approved fittings and adequately supporting the complete system.
- B.** Provide anti-sway brackets on all horizontal tray assemblies where necessary.
- C.** Connect each isolated cable tray system or the entire tray system to the building equipment grounding system with a green insulated conductor in accordance with the NEC.
- D.** Base size determination on the largest power conductor in the rack.
 1. Minimum size: No. 6
 2. Maximum size: 4/0 copper

3.7 UNDERFLOOR DUCTS AND FITTINGS

- A.** Install as shown on the Contract Drawings.
- B.** Accurately align and level the ducts with the top of inserts 1/8 inch below the finished concrete floor.
- C.** Hold ducts in place during pouring of concrete by use of duct support fitting designed for the duct used, spaced at five-foot intervals. Carefully level all boxes, with the tops flush with the finish floor.
- D.** Install appropriate insert markers in the last insert at all dead ends, on each side of partitions, and first insert adjacent to junction box to indicate high and low voltage services.
- E.** Seal duct installation watertight with an approved sealing compound.

3.8 WIRING

- A. General**
 1. Furnish wires and cables to the site in unbroken standard coils or reels, to which shall be attached a tag bearing the manufacturer's name, trade name of the wire, and the UL label for 600 volt wire and cable.

2. Provide all wiring complete as indicated. Provide ample slack wire for motor loops, service connections and extensions. In outlet or junction boxes provided for installation of equipment by others, tape ends of wires and install blank covers.
3. Do not bend cables during installation, either permanently or temporarily, to radii less than 12 times the outer diameters, except where conditions make the specified radius impracticable, and shorter radii are permitted by the NEC and NEMA Standard WC 7, Appendix N.
4. Neatly and securely bundle cable conductors located in branch circuit panelboards, cabinets, control boards, switchboards and motor control centers and pull boxes. Use nylon bundling straps.

B. Wire Pulling

1. Install wire and cable in conduit as indicated. Do not pull wiring into any conduit until conduits and outlets have been thoroughly cleaned and swabbed to remove water and debris. Do not use block or tackle or other mechanical means in pulling conductors smaller than No. 2 AWG in raceways.
2. Provide suitable installation equipment to prevent cutting and abrasion of conduits and wire during the pulling of feeders. Use lubricant and installation procedure as recommended by the cable manufacturer, and as approved by the Engineer.
3. Use masking or other means to prevent obliteration of cable identifications when solid color coating or colored tracers are used.
4. Pull together all cables to be installed in a single conduit.

C. Cable Supports. Install cable supports for vertical feeders in accordance with the NEC.

D. Splices and Terminations

1. Make wire and cable splices only in outlet, junction or pull boxes, or in equipment cabinets. Splices in conduit or raceway will not be permitted. Make splices by means of compression type connectors, and cover with tape to an insulation level equal to that of the cable.
2. Use positive type connector installation tools as recommended by the manufacturer.
3. Mechanical hand tools, with dies for each conductor size, recommended by the manufacturer, may be used on conductor sizes through No. 4/0.
4. For conductor sizes larger than No. 4/0, use hydraulic tools with hexagonal or circumferential installing dies for each conductor size, as recommended by the manufacturer.
5. For inspection purposes, clearly mark die numbers on the installed connectors.
6. Before installation, apply anti-corrosion electrical joint compound to conductors and terminal bolting pads.

3.9 WIRING DEVICES

- A. Locate switches four feet above finished floor, except as otherwise indicated.
- B. Attach receptacles rigidly to outlet box by means of two screws.
- C. Wire duplex receptacles, where so indicated, so that one unit of the duplex may be controlled by a wall switch and the other unit remain continuously energized.

- D. For exterior locations, mount receptacles in watertight cast type outlet boxes with threaded hubs or bosses and equipped with gasketed cover and captive cap of the screw or twist type.
- E. Provide equipment permanently connected to exterior receptacles, or in areas subject to spray or hose cleaning, with watertight male plugs to suit. Such receptacles shall be of the ground fault circuit interrupter type, as specified herein.
- F. Furnish one matching plug with each receptacle, as indicated, installed in the work.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 16121

INSULATED CONDUCTORS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies furnishing and delivery of insulated conductors for use in feeder taps, jumpers and other assemblies as part of an overhead contact system with a nominal voltage of 600 volts dc as shown on the Contract Drawings.

1.2 REFERENCES

Insulated conductors shall be manufactured and tested in accordance with the pertinent provisions of the most current applicable standards of the American Society for Testing and Materials (ASTM), Insulated Cable Engineers Association (ICEA), National Electrical Manufacturer's Association (NEMA), National Electric Safety Code (NESC), National Electric Code (NEC), Association of American Railroads (AAR), and other recognized standards including, but not limited to those listed below:

ICEA No. S-68-516/NEMA No. WC8-1976 - Standards Publication for Ethylene-Propylene Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

ASTM-B8 - Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-hard or Soft

ASTM-B33 - Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes

ASTM-B172 - Standard Specification for Rope-Lay-Stranded Copper having Bunch-Stranded Members for Electrical Conductors

ASTM-B173 - Rope-Lay-Stranded Copper Conductors having Concentric-Stranded Members for Electrical Conductors

ASTM-B174 - Specification for Bunch-Stranded Copper Conductors for Electrical Conductors

NEMA WC26 - Wire and Cable Packaging

One copy each of the above standards shall be furnished to the Authority for their use and permanent record.

1.3 SUBMITTALS

- A. The following information shall be submitted in accordance with Section 01300:
1. Shop drawings, catalog cuts, and other forms of descriptive data delineating the construction of the cables specified herein.

2. Special storage instructions, if applicable.
3. Recommended splicing, repair materials and procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Shipping shall take place in conformance with appropriate industry standards for packing, sealing and shipping. The Contractor shall ensure that all materials furnished are suitably packaged and protected against damage during delivery and transportation. All conductors shall be shipped on reels, suitable for the weight of the conductors and shall be protected from damage. The diameter of drum shall be sufficiently large so as to minimize difficulty with waves or kinks when the conductor is strung.
- B. The conductors shall be handled and otherwise used in accordance with the manufacturer's instructions, so as to ensure that the products are not damaged or misused prior to installation.
- C. Any damage to the conductors in transit shall be the Contractor's responsibility, and all repairs and replacements shall be accomplished by the Contractor at no cost to the Authority.
- D. Each reel shall consist of one continuous, unspliced conductor and shall have the required length of conductor within a tolerance of plus 50 feet and minus zero feet.
- E. Each reel shall have a strong, weatherproof tag or marker securely fastened to it, showing the size and type of conductor as well as the ASTM designation, name and mark of the manufacturer, total reel length, weight and manufacturer's special instructions.
- F. Reels shall be tagged with material description and purchase order number.

1.5 WARRANTY

- A. The Contractor shall guarantee that the cable furnished under this Contract is of first-class material and workmanship throughout and agrees to replace any length of cable failing during normal and proper use, within one year of date of placing in service which shows defects of material or workmanship, provided, in each case, that immediate written notice of such failure is given to the Contractor with all reasonable opportunity to inspect such failure.
- B. The date of placing in service shall be interpreted as the date on which operating voltage was first applied.

PART 2 - PRODUCTS

2.1 4/0 AWG, EXTRA FLEXIBLE, INSULATED CONDUCTOR

- A. Cable shall be used for feeder tap connections on an overhead contact system with nominal voltage of 600V. The cable shall be in accordance with MBTA Specification P-179, except as modified herein, which shall be included as Appendix A to this Section.
- B. The cable conductor shall be single conductor, black, extra flexible ethylene-propylene rubber insulated, neoprene or hypalon jacketed in accordance with applicable requirements of ICEA No. S-68-516/NEMA No. WC8-1976, 5/64 inch insulation and 3/64 inch jacket and rated 1,000 volts,

90°C.

- C. The conductors shall be 4/0 AWG, 259 strands minimum, tinned copper in accordance with ASTM-B33 with Class H stranding as specified in ASTM-B173.
- D. The cable shall be marked at intervals of no more than 36 inches to show manufacturer's name, year of manufacture, AWG size, voltage class, type and thickness of insulation (mils), and type and thickness of jacket (mils).

2.2 500 KCMIL INSULATED CONDUCTOR

Cable shall be used for feeder tap connections on an overhead contact system with nominal voltage of 600 volts. The cable shall be in accordance with MBTA Specification P-25A, except as modified herein, which shall be included as Appendix B to this Section.

PART 3 - EXECUTION

3.1 INSTALLATION

Insulated conductors shall be installed either separately or as part of one or more assemblies in accordance with the Contract Drawings.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART I - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies the furnishing and installing of nameplates and labels, wire and cable markers, and conduit markers. Engraved nameplates shall be designed, furnished and installed for every major piece of electrical equipment shown on the single-line diagrams. The single-line diagrams are shown on the Contract drawings.
- B.** Related requirements are included in, but not limited to, the following Sections.
 - 1. Section 09900: PAINTING
 - 2. Section 16050: BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK

1.2 REFERENCES

- A.** National Fire Protection Association (NFPA)
 - 1. NFPA No. 70 - National Electrical Code

1.3 SUBMITTALS

- A.** Submit in accordance with Section 01300, except as modified herein.
- B.** Product Data/Catalog Cuts
 - 1. Nameplates and labels.
 - 2. Wire and cable markers.
 - 3. Conduit markers.
- C.** Certificates of Compliance
 - 1. Nameplates and labels.
 - 2. Wire and cable markers.
 - 3. Conduit markers.
- D.** Manufacturer's Instructions
 - 1. Delivery, handling, transportation, storage and protection.

2. Surface preparation, and application/installation of products.
 3. Application conditions and limitations of use.
- E. Engraved nameplate schedule shall be submitted for review and approval by the Engineer.
- F. Submittals required for painting work shall be as specified in Section 09900.

1.4 DELIVERY, HANDLING, TRANSPORTATION, STORAGE AND PROTECTION

Delivery, handling, transportation, storage and protection shall be in accordance with the manufacturer's instructions, unless otherwise required by Division 1.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Conform to requirements of NFPA No. 70.
- B. Provide products listed and classified by Underwriters Laboratories, or a testing firm acceptable to authorities having jurisdiction as suitable for purpose specified and indicated.
1. The Contractor shall submit certificates of compliance for products provided.
 2. The Contractor shall provide the manufacturer's instructions indicating application conditions and limitations of use stipulated by the product testing agency.

2.2 NAMEPLATES AND LABELS FOR EQUIPMENT

A. Nameplates and Labels

1. Engraved three-layer laminated plastic, black letters on white background.

B. Locations

1. Electrical equipment including, but not limited to, each electrical distribution enclosure and control equipment enclosure, communication cabinets, transfer switches and panels.

C. Letter Sizes:

1. Use 1/4-inch letters for identifying individual equipment and loads.
2. Use 1/4-inch letters for identifying grouped equipment and loads.
3. Use 1/8-inch letters for identifying voltage, phase, and neutral.

2.3

WIRE MARKERS

- A. Wire markers shall be manufactured by Panduit, Ideal, 3M, or approved equal.
 - 1. Description: Cloth tape or tubing type wire markers.
 - 2. Locations: Each conductor at panelboard, gutters, pull boxes, outlet and junction boxes and each load connection.
- B. Legend
 - 1. Power and lighting circuits: Branch circuit or feeder number indicated on the Drawings.
 - a. Control circuits: Control wire number indicated on schematic and interconnection diagrams on the Drawings.
 - 2. Power supervisory control and data acquisition (SCADA) system circuits:
 - a. Circuits shown on the riser diagrams or schematic diagrams. The riser diagrams and schematic diagrams are shown on the Drawings.

2.4

CONDUIT MARKERS

- A. Conduit markers shall be manufactured by Banded Labeling System, Brady USA, Inc., Panduit, or approved equal.
- B. Location: Furnish markers for each conduit longer than 6 feet.
- C. Spacing
 - 1. Spacing shall be 20 feet on center, unless otherwise specified.
 - a. Fire alarm conduits shall be marked every 10 feet.
 - b. 13.8 kV system shall be marked for its entire length.
- D. Color:

<u>System Name</u>	<u>Color</u>
1. 480-volt system	Orange
2. 208 volt system	Blue
3. Fire alarm system	Red
4. Telephone system	Gray
5. 13.8 kV system	Yellow
6. Management information system	Purple
7. Passenger assistance system	Green
8. Public address system	White
9. Closed circuit television system	Black
10. Power SCADA	Pink

E. Legend:

<u>System Name</u>	<u>Legend</u>
1. 480 volt system	480 V
2. 208 volt system	208 V
3. Fire alarm system	FAS
4. Telephone system	TS
5. 13.8 kV system	13.8 kV
6. Management information system	MIS -
7. Passenger assistance system	PNRA
8. Public address system	PAS
9. Closed circuit television system	CCTV
10. Power SCADA	PSCADA

2.5 PAINTED CONDUIT IDENTIFICATION

- A.** Conduit shall be painted for identification purposes. Paint system Identification Number shall be as specified Section 09900 - PAINTING
- B.** Paint colored band on each conduit longer than 6 feet.
- C.** Paint bands, 3 inches wide, 20 feet on center, unless otherwise specified.
1. Fire alarm conduits shall be painted every 10 feet.
 2. 13.8 kV system shall be painted for its entire length.
- D.** Color

<u>System Name</u>	<u>Color</u>
1. 480-volt system	Orange
2. 208 volt system	Blue
3. Fire alarm system	Red
4. Telephone system	Gray
5. 13.8 kV system	Yellow
6. Management information system	Purple
7. Passenger assistance system	Green
8. Public address system	White
9. Closed circuit television system	Black
10. Power SCADA	Pink

2.6 UNDERGROUND WARNING TAPE

- A.** Underground warning tape shall be manufactured by Panduit, Ideal, Seton, or approved equal.
- B.** Description: Underground warning tape shall be 6 inch wide plastic tape, colored yellow with suitable warning legend describing: CAUTION - BURIED ELECTRICAL LINES BELOW.

PART 3 - EXECUTION

3.1 PREPARATION

Degrease and clean surfaces to receive nameplates, labels and markers, in accordance with the manufacturer's instructions.

3.2 APPLICATION INSTALLATION

- A. Application/installation of products shall be in accordance with the manufacturer's instructions.
- B. Nameplates and Labels
 - 1. Install nameplates and labels parallel to equipment lines.
 - 2. Secure nameplate to equipment front using screws.
 - 3. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- C. Conduit Identification by Markers
 - 1. Identify conduit using conduit markers.
 - a. Apply conduit markers parallel to conduit runs.
- D. Conduit Identification by Painting
 - 1. Identify conduit, using paint. Paint shall be field applied.
 - a. Painting, including surface preparation, shall be in accordance with Section 09900 - PAINTING
- E. Identify underground conduits using underground warning tape. Install one tape per trench at 12 inches below finished grade.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 - MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 16450

GROUNDING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies furnishing and installing complete system neutral grounding, equipment grounding, and building structural grounding.

1.2 SUBMITTALS

- A. As-Built Drawings. Submit prior to final acceptance of the work, drawings showing complete layout of systems installed including physical location of ground rods to which connections were made.
- B. Field Quality Control Test Report. Submit reports complying with requirements of Part 3 "Field Quality Control" Article.

PART 2 - PRODUCTS

2.1 BARE GROUND WIRE

- A. Soft drawn copper, Class A or Class B stranded, meeting the requirements of ASTM B8; size in accordance with the NEC except where sizes specified herein or shown on the Contract Drawings are larger than those required by NEC; UL listed, Label A for lightning protection conductors. Grounding cable shall be continuous without joints or splices through its length.

2.2 INSULATED GROUND WIRE

- A. Copper, Class B Stranded, 600-Volt, 90 degree C, NEC type THWN; meeting requirements of AAR Specifications No. 535.2; sized as indicated; and UL listed.

2.3 PRODUCTS USED FOR COPPER THERMIT WELDED CONNECTIONS

- A. Use products for copper thermit welded connections which are the products of one manufacturer and are produced for the specific application for which they are used.
- B. Use materials and equipment which meet or exceed the applicable acquirements of the AAR Manual, Electrical Section, Section 13, Chapter 3, Part 6.

- C. Coating Materials for Thermit Welded Connections: Use black, rubber based compound coating materials, which are soft, permanently pliable, moldable, and unbacked, not less than 1/8 inch thick, with properties as follows:

Solids	100 percent
Density	12.0 pounds per gallon minimum
Penetration	90-130 ASTM D5
Water Absorption	0.10 percent maximum ASTM D570
Dielectric Strength	500 volts/mil ASTM D149
Volume Resistivity	2,000 megohms-inches ASTM D257 5,000 megohms-cm ASTM D257
Service Temperature	Minus 40 degrees to 160 degrees F.
Chemical Resistance	Melting point, none; flammability, slow burning (ASTM C653); resists alcohol, water, aqueous hydrochloride and sodium hydroxide; dissolved by carbon tetrachloride, naphtha gasoline, mineral spirits, ketones, and benzene.
Highly cohesive and Adhesive	Adheres strongly to metals and concrete and to itself.

2.4 BOLTED GROUNDING CONNECTORS

- A. For solderless type made of high strength electrical bronze with silicon bronze clamping bolts and hardware; designed such that bolts, nuts, lock washers and similar hardware which might nick or otherwise damage the ground wire will not directly contact the ground wire.

2.5 GROUND BUS

- A. 1/4 inch by 2 inch copper bus bar mounted as shown on the Contract Drawings; drilled and tapped to receive ground cable connections from the ground rod assembly and ground connections for equipment as required.

2.6 GROUND RODS

- A. Medium carbon steel core, copper clad by the molten weld casting process; sizes as shown on the Contract Drawings; UL approved.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform testing as specified in Part 3 "Field Quality Control" Article.

3.2 GENERAL GROUNDING REQUIREMENTS

- A. General. Provide station electrical grounding complying with procedures of NEC and as indicated.
- B. Equipment Ground Conductors
 - 1. Provide each conduit entering switchgear with equipment ground conductor, colored green.
 - 2. Terminate conductor directly on ground bus for switchgear equipment housing and conduit system; do not connect equipment ground conductor to neutral bus. Additionally, do not use these conductors to carry any line-to-ground loads, such as 277 volt lighting.
 - 3. Provide feeders serving three-phase, 480 volt, or single phase, 480 volt loads with one equipment ground conductor.
- C. White Neutral Conductor. Provide each conduit feeding line-to-ground loads, such as 277 volt lighting with both an equipment ground conductor and insulated white neutral conductor.
- D. At Double-Ended Substations Serving Station Service Equipment
 - 1. Provide switchgear having neutral bus with isolating links and single ground between neutral bus and ground bus. Additionally, neutral bus shall be insulated from switchgear housing and conduits.
 - 2. Provide neutral buses and equipment ground bus bonding conductors with ground fault sensors having vector summation ground fault protection to select whether ground fault is fed from transformer "A" or transformer "B" and capable of opening appropriate breaker with shunt trip devices provided with breakers.
- E. Provide convenience outlets having ground fault circuit breakers, complying with Section 16050 – BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK.

3.3 SYSTEM NEUTRAL GROUNDING

- A. General. Provide three-phase alternating current secondary distribution systems wye connected with neutral grounding at the source.
 - 1. Run throughout as indicated, system neutral and ground bus and equipment ground conductor or both as indicated. Wye-connect generators and ground neutrals. On wye systems where generator neutrals are grounded at unit, to prevent improper operation of ground fault protection equipment, provide four-pole transfer switches, except at 13.8 kilovolt feeder breakers serving primaries of load center unit substations with automatic transfer accessories.
 - 2. Solidly ground neutral deriving equipment.

3. Connection Secondary Wye Neutral Points.
 - a. At Equipment Described in Part 3 Article above. Connect neutral points to primary source equipment ground and where applicable secondary ground bus.
 - b. At Power Transformers and Load Centers. Provide copper conductors, sized, as indicated, but in no case smaller than that required by NEC.
 - c. At Dry-Type Transformers. Use equipment ground conductor for connection of equipment and neutral to ground system.
4. Where source of power is from an electric utility company, at point of service to facility, solidly interconnect utility ground system by way of equipment ground system and where feasible building structural ground system.

3.4 EQUIPMENT GROUNDING

- A. At each station and traction substation, install one-quarter inch by two inch copper ground bus continuously around inside periphery and connect to grounding electrodes at intervals as indicated. Additionally, provide same type ground bus at periphery of electrical equipment rooms and train control rooms.
- B. Alternating Current Switchgear, Switchboards and Motor Control Centers.
 1. Connect continuous equipment ground bus at each end by copper ground wire to building or facility ground bus.
 2. Provide ground wire equal in size to largest conductor in line feeding equipment, but not less than No. 6 AWG, nor larger than No. 4/0 AWG.
 3. Install ground wire in rigid steel conduit bonded at both ends.
- C. Wiring, Channels, Cable Trays, Metallic Conduit, Rigid Electrical Metallic Tubing, Flexible Conduits, Metallic Boxes, Panelboards, Generator Frames and Transformer Enclosures. Ground to ground bus with copper ground conductors sized as specified in the Construction Specifications.
- D. Motors, Lighting Fixtures and Equipment in Part 3 Article above.
 1. Accomplish grounding with equipment ground.
 2. Provide equipment ground conductor electrically and mechanically continuous from system equipment and neutral ground connection at source of supply to equipment to be grounded.
- E. Building Type Conductors
 1. Where conductors are installed in raceways, run equipment ground conductor for alternating current systems within raceways with circuit conductors.
 2. Provide copper equipment ground conductor minimum one size smaller than phase conductors, except having minimum size of No. 12 and maximum size No. 4/0 AWG.
 3. Identify equipment ground conductors with colored green type THW insulation, except where green insulation is not available on larger sizes, black colored insulation shall be used and suitably identified with green tape at each junction box or device enclosure.
- F. Junction Boxes and Other Enclosures Sized Above Five Square Inches. Securely bond equipment ground conductors to enclosures utilizing equipment ground bus or lug.

3.5 BUILDING STRUCTURAL GROUNDING

- A. Ground Bus. Provide copper ground bus loop sized as indicated, buried to minimum depths and in accordance with details as indicated.
- B. Ground Electrodes
 - 1. Space electrodes as indicated, and connect each electrode to ground bus loop with copper conductor as indicated.
 - 2. Provide copper-coated, high-strength steel rods conforming to ASTM B228, Grade 40HS, sizes as indicated, having threaded bronze couplings, and driven to depths indicated. Additionally, locate top of electrodes minimum depth below grade and in accordance with details as indicated.
 - 3. Where soil conditions make it impossible to drive ground electrodes to depth indicated, provide three ground rods spaced maximum of 10 feet apart in shape of equilateral triangle and interconnected with copper ground conductor as indicated.
 - 4. Make below-grade connections by brazing or thermite welding.
- C. Steel Columns, Steel Reinforcing Bars and Other Materials.
 - 1. Connect steel columns or steel reinforcing bars in exterior walls to ground bus loop at intervals indicated. For bare copper connections, utilize brazing or thermite welding at ground bus loop and brazing, thermite welding, or bolted pressure fitting at steel columns. Make connections at steel columns 18 inches above finished floor in web of columns.
 - 2. Connect steel columns inside buildings to ground bus loop on each side of each building, with continuous bare copper conductor, as indicated.
 - 3. In buildings using materials other than steel for columns and where roof structure is steel, ground steel roof beams to ground bus loop similar to the methods described in Part 3 Articles above.
- D. Connect domestic and fire protection metallic water pipes to ground bus loop with bare copper conductor, as indicated, at a minimum of two points.
- E. Connect medium voltage switchgear and load center equipment ground bus to ground bus loop with copper conductor, as indicated, at minimum of two points.
- F. Connect miscellaneous metal objects, including piping, vessels, and structural shapes, within six feet of electrically-grounded metallic objects to ground system with a minimum No. 6 AWG bare copper conductor.
- G. Where a lightning protection system is provided in the form of air terminals of non-conductive materials or in the form of metal protuberances, connect these systems to ground bus loop with copper conductors equivalent to No. 2/0 AWG copper. Provide systems designed in accordance with requirements of NFPA No. 78.

3.6 CONVENIENCE OUTLETS

- A. Ground all convenience outlets in accordance with the NEC.

3.7 THERMIT WELDING CONNECTIONS

- A. Connect electrical wires together, to reinforcing steel or soldier piles, as indicated, by thermit welding using the manufacturer's recommended molds and size of charges for application.
- B. Prepare the material to be welded and perform thermit welding in accordance with manufacturer's instructions.
- C. Test completed thermit welds before coating by striking with two pound hammer. If cracks develop, replace welds at no additional expense to the Authority. When required by the Engineer, test the electrical continuity of bonds.
- D. Apply coating so that it extends one inch beyond point of attachment to steel member, overlaps wire coating one inch, and provides insulation thickness equivalent to wire insulation, but not less than 1/8 inch in thickness. Do not apply coating material at ambient temperatures below 20 degrees F or above 125 degrees F. Maintain, by an approved method, curing temperature within above temperature range for at least four hours after application of coating. Protect coating by approved means until embedment.

3.8 FIELD QUALITY CONTROL

A. Testing Existing Grounding Systems

- 1. General. Prior to installation of grounding systems specified under this Contract, test related grounding systems installed under previous or adjoining contracts to extent as indicated or specified in the Construction Specifications.
- 2. Test Report. Provide test report completely describing ground resistance test procedures and giving test results.
- 3. Ground Resistance Testing
 - a. Testing. Verify that resistance between ground and absolute earth for existing grounding systems does not exceed two ohms without benefit of chemical treatment or other artificial means, unless indicated otherwise in the Construction Specifications.

B. Testing Building Structural Grounding

- 1. General. After installation of ground loop bus and ground electrodes, and prior to interconnection of other grounding systems perform ground resistance testing.
- 2. Test Report. Provide report giving results of testing procedures, which shall also include temperature, humidity, and condition of soil at time of tests.
- 3. Ground Resistance Testing
 - a. Test Equipment and Method. Perform testing using ground resistance direct-reading single test meter utilizing alternating current fall-of-potential method and two reference electrodes.
 - b. Test Procedure
 - 1) Orient ground electrode to be tested and two reference electrodes in straight line space minimum 50 feet apart.
 - 2) Drive two reference electrodes five feet deep.
 - c. Test Requirement or Limits. If ground resistance exceeds two ohms, install additional ground electrodes until resistance is two ohms or less.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 16471

DISTRIBUTION AND BRANCH CIRCUIT PANELBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies distribution and branch circuit panelboards and panelboard enclosures.
- B. Related Work- Related work should be performed under sections 16050-Basic Methods for Electrical Work, 16450-Grounding, and 08711-Door Hardware

1.2 SUBMITTALS

- A. Submit for approval catalog cuts, drawings, and data, for each item, indicating the following:
 - 1. Manufacturer's model number or item identification.
 - 2. UL listing and rating.
 - 3. Critical dimensions and mounting arrangements.
 - 4. Complete replacement parts list.
- B. Enclosures: Materials and methods of construction, door arrangement, conduit hub and knockout locations, and identification of intended panelboard.
- C. Circuit Breakers: Circuit for which intended, voltage ratings, insulation level, current rating, and interrupting ratings.
- D. Panelboards: Base material, general arrangement, location and identification of each circuit breaker and the circuit breaker information specified above, location and identification of all terminals, location of barriers, applicable UL 67 Tables A through F information, wiring diagrams, and identification of the enclosure for which intended.

1.3 QUALITY ASSURANCE

- A. Manufacturing: Manufacturer's and UL standard inspecting and testing procedures.
- B. UL Labels
 - 1. Each factory-assembled enclosure panelboard.
 - 2. Each panelboard shipped separately.
 - 3. Each circuit breaker shipped for field mounting.
- C. Listing and Special Marking

1. Each enclosure shipped separate from panelboard shall be UL listed and marked with the identification of the panelboard for which intended.
2. Raintight marking for all enclosures exposed to weather or unusual spray or moisture conditions.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Distribution and branch circuit panels shall be enclosed, completely factory assembled type unless otherwise approved, dead-front grounded enclosure complete with circuit breakers as shown on the Contract Drawings. Design and assemble interiors so that any individual breaker can be replaced without disturbing adjacent units or without removing main bus connectors. Design main buses and back pans of distribution panelboards such that branch circuits may be changed without additional machining, drilling or tapping. Provide cutout type only where specifically indicated.
- B. Materials of construction: UL 67; appropriate NEMA Standards, UL listed.
- C. Field Wiring and Miscellaneous Hardware: Section 16050 – BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK and Section 16450 - GROUNDING, UL listed.
- D. Field Touch-up or Repainting Paint: As recommended by enclosure manufacturer.

2.2 CIRCUIT BREAKERS

- A. In Battery Rooms and Other Hazardous Locations: UL 877, class appropriate to hazard, appropriate rating or as indicated.
- B. Circuit Breakers of the Same Ratings: Interchangeable, quick-make, quick-break.
- C. Circuit Breakers for 125 Volt Battery Power: Rated at 10,000 Amperes interrupting at 250 Volts DC; 2-pole unless otherwise indicated.
- D. Breakers shall have an interrupting rating not less than 10,000 amperes rms symmetrical or as otherwise indicated. The breaker trip element; enclosed compensated for temperature rise and calibrated to 40°C ambient temperature.
- E. Circuit breakers shall be of the indicating type, providing "on", "off", and "tripped" positions of the operating handle. When the breaker is tripped automatically, the handle shall assume a middle position between "on" and "off". All multi-pole breakers shall be so designed that an overload on one pole automatically causes all poles to open. The circuit breaker shall be quick-make and quick-break on manual as well as automatic operation and shall have inverse time characteristics secured through the use of a bimetallic tripping element supplemented by a magnetic trip.
- F. The branch circuit breakers shall have fixed thermal-magnetic trips, of values shown on the Contract Drawings, and shall have minimum UL listed interrupting ratings of 10,000

symmetrical amperes at 208Y/120 Volts and 14,000 symmetrical amperes at 480/277 Volts. All breakers shall be bolt-on type.

- G. Provide handle "lock-on" devices on the circuit breakers indicated on the schedules. "Lock-on" devices shall prevent accidental deenergization of critical circuits. These devices shall be trip-free, permitting the circuit breaker to trip automatically on overload. Provide one "lock/on" device for every four circuit breakers indicated in the lighting and power panels. Furnish the Authority for future use all "lock-on" devices not installed.
- H. All circuits, which serve convenience outlets, shall be protected by ground fault circuit breakers for personnel protection.
- I. Main panel circuit breaker must be GFI.

2.3 ENCLOSURES

- A. Panel type with butt hinged door or doors with cylinder housing capable of receiving cylinder specified in Section 08711 - DOOR HARDWARE. Trim must also be hinged.
- B. Mark enclosures for easy identification of intended panelboard unless panelboard is shipped factory installed.
- C. Enclosures for mounting exposed to the weather or in unusually wet locations shall be rainproof type, and so marked. All others shall be standard type.
- D. Directory: Card type, suitable for typewriting directory of circuits, mounted under unbreakable transparent protective cover set in metal frame on inside of door, with provisions for:
 - 1. Panel designation and panel or switchboard from which panel is fed.
 - 2. For each circuit breaker, complete information concerning the circuit controlled, including the voltage and the area, room number, or appliances served; or Main or Spare as applicable.
- E. Finish: Thoroughly cleaned, phosphatized or equivalent, coated with at least one coat of corrosion resisting paint inside and out suitable for the material, and painted with manufacturer's standard electrical grey paint suitable for touch-up or repainting in the field.

2.4 PANELBOARDS

- A. UL listed and UL labeled unless shipped as a factory-mounted component of a UL labeled enclosed type panelboard with bases not over 48 inches top edge to bottom edge.
- B. Interrupting Devices: Circuit breaker type except where cutouts, meter fuses, or switches are specifically indicated. All cutouts, fuses and pull-out type UL listed.
- C. Panelboards, where shown on the Contract Drawings, shall be equipped with a main protective device consisting of a three-pole switch and current limiting fuses. Ratings shall be as indicated on the panelboard schedules.

- D. Panelboards shall be furnished with an insulated solid neutral bus and a suitable grounding, bus-connected to interior of panel enclosure for termination of green equipment grounding conductor.
- E. Panelboards shall have provisions, including space, terminals, and bus capacity, for future addition of at least one and not less than 10% of the total outlet circuit breakers of each rating. Close extra spaces with spare breakers.
- F. Terminals: Rated solderless type, suitable for either copper or aluminum conductors sized at maximum rated terminal capacity.
- G. Buses and Connecting Straps: Solid copper, main bus rated at the sum of the branch circuit ratings, including motor loads in accordance with Section 430-24 of the National Electrical Code plus 100% of the sum of the trip ratings of the spares specified in paragraphs above, but in no case less than specified in UL 67. Full neutral bus and separate ground bus.
- H. DC Circuits: Completely segregated from ac circuits in UL approved manner, with each DC terminal separated from other DC circuits by UL approved DC type barriers.
- I. Color markings per optional provision UL 67, Paragraph 143.
- J. Marking for easy identification of intended enclosure unless shipped factory mounted in enclosure.
- K. Permanent numerical identification by each breaker space.
- L. Spare breaker spaces closed with spare breaker. Must provide space for 100% spare breakers.
- M. Panelboard cabinets shall have means for securing, supporting, and adjusting the panelboards and trim.
- N. Panelboard gutter space shall be as required by the NEC.
- O. Where gutter spaces are occupied by feeder cables, gutter spaces shall be increased as required.
- P. Panelboard cabinets shall be ordered without knockouts.
- Q. Panelboards shall be furnished with an insulated solid neutral bus and a suitable grounding bus connected to interior of panel enclosure for termination of green equipment grounding conductor.
- R. All panelboard covers and doors must be hinged.

2.5 ENCLOSED PANELBOARDS

- A. Conform to requirements specified in Part 2 "Panelboards" Article.
- B. UL Enclosed Panelboard Label: Form 6, Form 12, or general. Enclosed cutout label only where cutout is specifically indicated.

2.6 DISTRIBUTION PANELBOARDS

- A. Distribution panelboards shall be 480/277 Volt, three phase, four wire, and shall have bolt-in type molded case circuit breakers in the quantities and sizes indicated.

2.7 POWER PANELBOARDS

- A. Power panelboards shall be 120/208 Volt, three phase, four wire, or 480/277 volt, three phase, four wire, and shall have bolt-in type molded case circuit breakers in the quantities and sizes indicated.

2.8 LIGHTING PANELBOARDS

- A. Miscellaneous power and lighting panelboards shall be 208/20 volt, three phase, four wire, and shall have single pole, 277 Volt, bolt-in type molded case circuit breakers in the quantities and sizes indicated.

2.9 MISCELLANEOUS POWER AND LIGHTING PANELBOARDS

- A. Miscellaneous power and lighting panelboards shall be 208/120 Volt, three phase, four wire, or 277 Volt single phase, three wire, and shall have 10,000 Amp interrupting capacity bolt-in molded case circuit breakers in the quantities and sizes indicated.

PART 3 - EXECUTION

3.1 GENERAL

- A. Prior to commencing installation, verify that all surfaces upon or in which enclosures are to be mounted are properly prepared and that all pre-mounting wire pulling has been completed and properly tagged. Take corrective action if necessary.
- B. Verify that enclosure mounting provisions are suitable for intended mounting. Make corrective adjustments, if necessary.
- C. Verify that all factory-installed circuit breakers are correct rating for the applicable circuit application as indicated. Take corrective action if necessary.
- D. Install panelboards in enclosures in accordance with manufacturer's instructions, if practicable before mounting enclosure.
- E. Complete all directory cards with the information indicated in Part 2 "Enclosures" Article above. Typewrite information on directory cards.

3.2 ENCLOSURES AND PANELBOARDS

- A. Install at indicated or approved locations in accordance with manufacturer's instructions, and at convenient operating height such that no manually operable device will be within 2- 1/2 feet of the floor or more than 6-1/2 feet above the floor, and so that the mid-point of all manually operable devices is as nearly as practicable 5-1/2 feet above the floor without exceeding the above maximum height limitations.
- B. Adjust straight and plumb and fasten securely in place. Align and securely and independently fasten each section of multi-section enclosures.

3.3 WIRING

- A. Perform wiring in accordance with Section 16050 – BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK, and UL 67; NFPA 70, Article 240; and manufacturer's instructions.
- B. Perform circuit wiring as specified in Section 16050 – BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK.
- C. Ground as specified in UL 67; NFPA 70, Articles 200 and 250; and Section 16450 - GROUNDING. Connect neutral wire directly to neutral bus, and ground wire to ground bus, in same panel as circuit interrupting device.
- D. Neatly route, harness and support conductors in gutters, wiring spaces and compartments. Bending radii not less than recommended by conductor manufacturer.
- E. Verify that circuits are wired as indicated and are continuous and free of shorts. Energize, as permitted by the Engineer, and test each circuit, including lights and outlets. Check voltage at outlets. Test other electrical equipment as recommended by manufacturer. Measure ground bus and grounded conductor resistance to true ground, resistance between enclosure and ground bus, between pairs of bus bars, and between insulation and ground bus. Resistances shall be within limits specified in Part 3 "Acceptance Tests" Article. If resistances are not within the limits specified, the cause of such resistances shall be determined and corrective action shall be taken to obtain the acceptable resistances specified.
- F. Install bonding jumpers from conduits entering cabinets to ground bus.

3.4 ACCEPTANCE TESTS

- A. Repeat the tests specified in Part 3 "Wiring" Article in the presence of and to the satisfaction of the Engineer. Test operation of each circuit and circuit control a minimum of 10 times and operation of each circuit continuously for a minimum of 1/2 hour. For all lighting circuits, comply with additional requirements specified in Section 16500 - LIGHTING.
- B. Acceptable Resistances
 - 1. Ground Bus and Grounded Conductor to True Ground: 2 Ohms maximum.
 - 2. Between Enclosure and Ground Bus: less than 0.1 Ohm.

3. Between Pairs of Bus Bars: 50,000 Ohms minimum.
4. Between Insulation and Ground Bus: 10 Megohms minimum.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

SECTION 16500

LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies lighting systems, complete and operable, as indicated, including fixtures; fixture mounting hardware including brackets, canopies, hangers, and poles; lamps; auxiliary lighting equipment; and lighting control equipment.
1. The equipment and materials required under this Section shall be in accordance with the general description as indicated in Section 16050 - BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK.
 2. Lighting levels shall exceed code minimums for safety and security purposes.
 3. Light control panels to be located separately from Communication, Traction Substations, and Unit Substation rooms.
- B.** Related Work: The equipment and materials required under this Section shall be in accordance with the general description as indicated in Section 16050 - BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK.

1.2 SUBMITTALS

- A.** Submit shop drawings, catalog cuts, descriptive information and photometric data for all lighting fixtures, lamps, auxiliary lighting equipment, lighting control equipment, and mounting hardware.
- B.** Submit manufacturer's installation instructions.
- C.** If specified, before production is commenced, submit a sample fixture of each style, mounting and lamp arrangement specified. Reports indicating that required tests specified have been successfully completed shall accompany each pre-production sample at the time it is submitted. The sample, if approved, will be retained until completion of the work to confirm quality conformance to the prescribed requirements herein. Provide the sample for operation at 120 volts with six-foot cord and plug.
- D.** Sample for finishes and colors:
1. Submit samples for acceptance showing nominal color(s) and gloss, and the high and low color and gloss range(s) within which the production materials will be processed.
 2. Identify samples as to alloy, pretreatment and color.
 3. Hold Point. Do not begin processing of production materials until Engineer's written approval of samples has been obtained.
 4. Maintain variation in color of installed materials to the color range established by the acceptance samples.

1.3 QUALITY ASSURANCE

- A. Fixtures and auxiliary equipment shall be listed, labeled or certified by UL.
- B. Replace lamps, which fail within 90 days after final acceptance, at no cost to the Owner.
- C. Installation Tolerances: Deviation from location, alignment and mounting height: 1/2 inch noncumulative in any unit or continuous run of fixtures.

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES

A. General Requirements

- 1. Provide lighting fixtures, complete and ready for service, in compliance with UL 57, of the number, type, material, finish, electrical components and characteristics, and with all necessary hardware and auxiliary equipment indicated.
- 2. The fixtures shall be clearly marked with manufacturer's name and catalog number, voltage, acceptable lamp type, maximum wattage, ballast type, and self-protection, if any.
- 3. Fixtures shall be rain-tight and dust-tight for use along trackways, for outdoor use, and as indicated. Fixtures must meet IP55 test for water and dust.
- 4. Minimize the type and variety of fixtures to be provided.
- 5. For AC, prefer the use of low mercury fluorescent, high output, 8 foot, T 12 lamp, 277 volt, magnetic ballast, 2 lamp, -20 F to 90 F fixture. (Lithonia DMW 96 HO, Simkar OV410296HO277V, Eastern VT296HO)
- 6. For DC, prefer 3 lamp, 600 volts, 24 inch length 17 watts, low smoke fixture, clear hinged lense metal frame wet location with 600 VDC rated in line fuse and externally mounted switch. (L.C. Doane M3-17-3-600VDC-LSA-FH).

B. Materials

- 1. Thicknesses, gauges and tempers of products: indicated, and as recommended by the manufacturer for the specific finish, proper forming operations and structural requirements.
- 2. Lighting sheet for reflector material: Prefinished aluminum, minimum thickness 0.032 inch, architectural Type 1 with Class M1, anodic coating providing 83% reflectively.
- 3. Acrylic lenses: 100% virgin acrylic plastic.
- 4. Polycarbonate lenses and diffusers: Injection molded, crystal clear material, polycarbonate.
- 5. Lenses to be clipped and hinged.

C. Finishes

- 1. Finishes shall be in accordance with the manufacturer's recommendations for the specific application.
- 2. Commence no finishing operations until fabrication and forming operations have been completed.

3. Aluminum work to be anodized shall be given a preanodic treatment followed by an architectural Class 1, anodic coating as described by the Aluminum Association.
 - a. Anodize aluminum in accordance with procedures established by alloy manufacturer to achieve color within specified range.
 - b. Apply a clear organic protective coating to exposed aluminum surfaces that may experience prolonged contact with caustic material, i.e., concrete, plaster.
4. Baked enamel: Factory applied to clean surfaces prepared with a chromate conversion coating, and prime coating, as indicated.
5. Porcelain enamel coating: In accordance with the requirements of Porcelain Enamel Institute, PEI-S-100.
6. Galvanized coating: Hot-dip galvanized or hot-zinc conforming to ASTM A 386. Where painting of the galvanized surface is indicated, prepare the surface with vinyl acid wash primer with polyvinyl butyral resin 56 pounds, 80 gallons zinc chromate pigment and phosphoric acid.

D. Electrical Components

1. Lampholders

- a. Lampholders and sockets: Class and style recommended by the lamp manufacturer for the specified lamp required by each fixture design and rated for 660 watts, 600 volts or as indicated. Rigidly and securely fastened to the mounting surfaced with the necessary provisions to prevent lampholder from turning and front removable without dismantling any part of the fixture. Located in the lighting fixtures to place each lamp, of size specified, in proper position with relation to the fixture design specified. Clearly marked to indicate manufacturer lamp type and voltage and appropriate listings.
- b. Incandescent and high intensity discharge (HID) lampholders: Glazed porcelain body with nonferrous metal components of heavy duty design, vibration resistant, Edison-based lampholders in accordance with the applicable requirements of UL 496.
 - 1) General purpose incandescent lamps: Medium screw base socket.
 - 2) Incandescent mogul base lamps of PAR configuration: Mogul end prong base socket rated 1000 watts, 125 volts.
 - 3) Special low wattage incandescent lamps such as the 20- watt T6-1/2: Phenolic bodied DC bayonet socket rated 75 watts, 125 volts.
 - 4) Single ended tungsten-halogen lamps: Minican screw socket.
 - 5) Double ended tungsten-halogen lamps: Recessed contact socket rated 3000 watts, 600 volts.
 - 6) Mercury lamps of the B, R or PAR configuration up to 175 watts: Medium screw base socket.
 - 7) Mercury or metal halide lamps that are to be operated in the horizontal position: Position oriented mogul base socket.
 - 8) High pressure sodium lamps up to and including 1000 watts: High voltage mogul lampholder, 5Kv pulse rated, 1500 watts, 600 volts.
- c. Fluorescent lamp holders: White urea, spring loaded with silver-plated contacts of the pedestal or butt-on type, in accordance with the applicable requirements of UL 542.
 - 1) Rapid start (430Ma) lamps: Medium bipin spring loaded lampholders of the tombstone or butt configuration.
 - 2) Rapid start (800 and 1500Ma) lamps: Recessed double contact lampholders of the telescopic type.

- 3) Instant start, slimline lamps: Single pin lampholder of the telescopic type.
2. Ballasts
- a. Ensure ballast operating characteristics comply with the recommendations of the lamp manufacturer with regard to lamp electrical characteristics. Provide ballasts suitable for the line voltage with 0.9 power factor, and maximum current crest factor of 1.8. The ballast shall provide reliable lamp starting at the minimum temperature indicated, and operate in ambient temperatures up to 105°C with maximum ballast case temperature of 90°C. Each ballast shall be securely mounted inside the fixture, in such a manner as to obtain the necessary heat dissipation. High intensity discharge ballasts shall conform to the applicable requirements of UL 1029. Fluorescent ballasts shall conform to the applicable requirements of UL 935.
 - b. Mercury lamps: Operated by a constant wattage autotransformer, CWA, type ballast. The ballast shall provide reliable single lamp starting at minus 20°F, and allow plus or minus five percent lamp watts variation for a plus or minus 10 percent input voltage variation.
 - c. Metal halide lamps: Operated by a lead peaked auto, LPA, type ballast. The ballast shall provide reliable single lamp starting at minus 20°F, and allow plus or minus 10 percent lamp watts variation for a plus or minus 10 percent input voltage variation.
 - d. High pressure sodium lamps 150 watt size and smaller: Operated by a constant wattage autotransformer, CWA type ballast. The ballast shall provide reliable lamp starting at minus 20°F, and allow plus or minus 5 percent lamp watts variation for a plus or minus 10 percent input voltage variation.
 - e. High pressure sodium lamps, 250 watt size and larger: Operated by a constant wattage autotransformer, CWA type ballast. The ballast shall provide reliable lamp starting at minus 20°F, and allow plus or minus five percent lamp watts variation for a plus or minus ten percent input voltage variation.
 - f. Rapid start, 430 Ma, fluorescent lamps: Operated by a Class P, 430 Ma, 60 hertz ballast. The ballast shall provide reliable lamp starting at 0°F, and shall be provided with a sound level rating of 'A'. Lamp voltage variation shall not exceed plus five percent and minus 10 percent.
 - g. Rapid start, 800 Ma, high output fluorescent lamps: Operated by a Class P, 800 Ma, 60 hertz ballast. The ballast shall provide reliable lamp starting at minus 20°F, and shall be provided with sound level rating of 'B' or better. Lamp voltage variation shall not exceed plus five percent and minus 10 percent.
 - h. Rapid start, 1500 Ma fluorescent lamps: Operated by a Class P, 1500 Ma, 60 hertz ballast. The ballast shall provide reliable lamp starting at minus 20°F, and be provided a sound level rating of D or better. Lamp voltage variation shall not exceed plus five percent and minus 10 percent.
 - i. Slimline and instant start lamps: Operated by a Class P, 425 Ma, 60 hertz ballast. The ballast shall provide reliable lamp starting at 0°F and shall be provided with a sound level rating of "B" or better. Lamp voltage variation shall not exceed plus five percent and minus 10 percent.
 - j. Radio interference filter shall be provided as indicated.
 - k. All ballasts to be magnetic not electronic due to interference caused by traction power sources.
 - l. One light fixture per ballast.
 - m. Avoid the use of remote ballasts.
3. Fixture Wiring

- a. Fixture Wires: Stranded tinned-copper construction, not smaller than No. 16 AWG. Insulation: silicone rubber type SF-2 and 200°C rated. Conductor size, temperature rating, voltage rating and manufacturer clearly marked on the insulation of each conductor.
- b. Use wires between lampholders and associated operating and starting equipment of the same ampacity rating as leads from the ballast. Wiring within the fixtures shall conform to the requirements of the NEC.
- c. Tape wires at all points of abrasion. No splices shall be permitted within fixtures other than as required to connect lampholders and ballasts.
- d. Fixture Grounding. Unless otherwise specified, the housing of each ballasted lighting fixture shall be provided with a separate, factory-installed grounding device. The grounding device is to be used for connecting a separate, green, grounding conductor to the fixture housing.
- e. Wireways and wiring channels shall have rounded edges or bushed holes wherever conductors pass through. Insulated bushings shall be installed at points of entrance and exit of wiring.

E. Fixture Hardware

1. Latch and release mechanism, hinges, pins and other retaining parts of fixtures; screws, bolts or other assembly and mounting parts: manufactured of Type 316 stainless steel. All springs: heavy duty stainless steel. All retaining hardware: self-retaining.
2. Frame light transmitting elements of the fixture to permit replacement of panels in the frames without the use of tools other than screwdriver or pliers. Secure panels in the frames in a neat, rattle-free manner that will provide proper tolerance for normal expansion and contraction.
3. Provide stems for all pendant mounted fixtures of length as required for the specified mounting height with swivel hangers or ball aligners as required.
4. Form gaskets, sealants and adhesives subjected to high temperature from silicone rubber. Provide other gaskets of neoprene, or as indicated.
5. Fasteners: Provide bolts, nuts, washers, screws, nails, rivets and other fastenings necessary for proper erection or assembly of work. When exposed to the atmosphere, provide fasteners made of 18-8 stainless steel. Fasteners within the housing shall be made of zinc plated, bright iridite, steel or electrogalvanized, gray. Nuts shall have captive externally footed lockwashers.

F. Welding

1. Locate welds in assemblies to be anodized to conceal visible discoloration in the heat-affected zone.
2. Where weld metal will be exposed after anodizing, select filler alloys to closely match composition of base metal. Comply with parent metal manufacturer's recommendations for such filler alloys.

2.2 FIXTURE MOUNTING HARDWARE

- A. General Requirements. Provide the fixtures with brackets, straps, canopies and stems, poles and miscellaneous hardware suitable for the mounting method specified.

- B. Secure mounting brackets to housing, quantity and spacing as indicated. When exposed to public view, fabricate and finish hardware in matching material to fixture body. Fabricate internal brackets from sheet steel, zinc coated after fabrication.
- C. Canopies, holders and similar parts shall be drawn or spun in one piece with a minimum 0.026 inch finished thickness.
- D. Tubing used for supporting member shall be seamless drawn with a minimum of 1/16 inch wall thickness of size and length as indicated.
- E. Light poles. Of the type, configuration and dimensions, indicated. The pole shall resist wind loads of 90 mph with a maximum deflection of five percent when fully loaded by their own weight, weight and wind resistance of luminaires they support, and any externally applied loads. Furnish poles as indicated with four by six inch handhole with flushcover, luminaire mounting (tenon/bracket), base cover and all mounting hardware including anchor bolts, nuts, washers and baseplate to permit accurate alignment and installation of pole and luminaire as indicated. All wiring splices to be located above ground. All exterior light poles to have a minimum 30 inch concrete base for protection from snow plows.

2.3 LAMPS

- A. General Requirements. Provide each lighting fixture with the number, type, and wattage of lamps required by the Contract Drawings. Provide lamps of standard manufacture, readily available, and of the highest efficiency and life consistent with other requirements of the illumination system.
- B. Incandescent Lamps: Rated for 120 volts, unless otherwise specified, and minimum 2000 hours life.
- C. Fluorescent Lamps: Wattage and types as indicated, with warm white color.
- D. Mercury Lamps: Color, white deluxe. Reflector face, if required, clear.
- E. Metal Halide Lamps: Clear and provided with position oriented mogul bases. Photometric characteristics shall provide lamp maximum luminous output while lamp operates in the vertical position.
- F. High Pressure Sodium Lamps: Clear and suitable for specified operating positions (base up or base down).

2.4 AUXILIARY LIGHTING EQUIPMENT

- A. General Requirements. Auxiliary lighting equipment intended to supply illumination in the event of failure of normal power supply: Conform to the applicable requirements of UL924, NEC, MBTA Life Safety Code, NFPA-101, Massachusetts State Building Code, and the Massachusetts Electrical Code.
- B. Unitized battery packs mounted integral with fluorescent fixtures shall energize upon failure of normal power and shall provide approximately the constant light output delivered under normal

power operation, for a period not less than 90 minutes. The unit shall contain a transistorized inverter ballast, a transfer relay and associated circuitry, a battery charger and batteries of nickel-cadmium. In addition, a test button and derangements signal light shall be provided to monitor the charging function.

- C. Battery packs mounted remote from luminaires: Conform to the applicable requirements of UL 924. The battery-powered source shall provide continuous power to lighting loads, consisting of any mix of HID, fluorescent, or incandescent lamps. During short power interruptions, brownout conditions or a total lapse of normal AC power, it shall supply the full rated load at both 120 and 277 volts for ninety minutes to a minimum voltage level of 87-1/2% of nominal voltage.

2.5 LIGHTING CONTROL EQUIPMENT

- A. General Requirements. Provide lighting control components suitable for the lighting system specified and compatible for interface with other associated control devices. Lighting control components shall be rated for continuous service and operate satisfactorily in every respect while the branch circuit power supply voltage to each system is within a 105 to 130 volt range at 60 hertz. Electrical contacts shall have precious metal surfaces.

- B. Lighting Contactors

- 1. Conform to the applicable requirements of UL 508.
 - 2. Electrically operated and mechanically held.
 - 3. Rated at 600 volts, 60 hertz with ampere rating, number of poles and enclosure as indicated.

- C. Lighting Relays

- 1. Conform to the applicable requirement of UL 508.
 - 2. Electrically operated and mechanically held.
 - 3. Rated at 600 volts, 60 hertz, 25 amperes with number of poles and enclosure as indicated.

- D. Time Switches

- 1. Conform to the applicable requirements of UL 887.
 - 2. Pre-wired with astronomic dial, 36-hour synchronous reserve power motor.
 - 3. Manual on-auto-off bypass switches for up to three individual circuits.
 - 4. Rated at 277 volts, 60 hertz, 40 amperes continuous duty with number of poles, throws and enclosure as rated.

- E. Photoelectric Sensor

- 1. Conform to the applicable requirements of UL 773.
 - 2. Operation in temperature range of minus 50°C to plus 60°C.
 - 3. Dusk to dawn operation with adjustments from two to 50 foot candles with a five-second time delay to preclude false switching.
 - 4. Weatherproof and tamperproof.
 - 5. Acceptable for operation from a supply voltage range of 105 to 285 volts AC.

6. Rated for a lamp load of 1000 watts of incandescent lighting; 1800 va of mercury vapor, fluorescent, or high-pressure sodium lighting.
7. Minimum life at rated load: 8000 on-off operations.
8. Provided with three blade, twist lock polarized plug and receptacle.
9. Photoelectric sensors shall be mounted facing a northerly direction.
10. 1Photoelectric sensors, upon failure, shall default to the "on lighting" position.

F. Light Intensity Controls

1. Enclosed, automatic or manually, continuously-adjustable, and completely solid state for the control voltage and rated load indicated.
2. Incandescent systems.
3. Fluorescent systems.
4. HID systems.

G. Wall Switches

1. Fed. Spec. W-S-896, types II and III. Switches installed in hazardous areas: Explosion-proof type in accordance with the NEC and as indicated.
2. Switches: Single unit, toggle, butt contact, quiet type with an integral mounting strap.
3. Wall switches for remote control: Momentary contact type suitable for mounting in a single gang outlet box space and compatible with standard design wall plates.
4. Switch Ratings
 - a. For 120 volt circuits: 20 amperes at 120 volts AC.
 - b. For 277 volt circuits: 20 amperes at 277 volts AC.
5. Switches shall be connected to the wiring with screw clamp type terminals.
6. Wall Plates
 - a. Type 304 stainless steel
 - b. Standard designs so the products of different manufacturers will be interchangeable.
 - c. Where switches are mounted adjacent to each other, the plates shall be common for each of the groups of switches.
7. Incorporate barriers between switches within multigang outlet boxes where required by the NEC.

PART 3 - EXECUTION

3.1 LIGHTING FIXTURES

- A. Install lighting fixtures in accordance with the manufacturer's instructions, complete with lamps, hangers, brackets, poles, fittings, and accessories, ready for operation as indicated. Align, mount and level the lighting fixtures uniformly.
- B. Avoid interference with and provide clearance for equipment. Where the indicated locations for the lighting fixtures conflict with the locations for equipment, change the locations for the lighting fixtures by the minimum distances necessary as approved by the Engineer.

- C. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as indicated. Chains shall not be used for suspension of fixtures.
- D. Lighting fixture supports shall provide support for all the fixtures. Anchor supports to the structural slab or to structural members as indicated. Supports shall maintain the fixture positions after cleaning and relamping.
- E. Surface mounted lighting fixtures shall be bracketed rigidly from the mounting surfaces. Provide a 1/4-inch clearance between surfaces when the fixture is flat mounted against concrete surfaces. Nipples carrying wire between fixtures shall be watertight.
- F. Exterior fixtures mounted on block or brick walls shall be supporting anchor devices of the expansive lead type. No power driven anchors will be acceptable.
- G. Where aluminum is placed in contact with dissimilar materials, except galvanized steel, zinc or stainless steel, treat contact surfaces as follows:
 - 1. When in contact with dissimilar metals, apply a prime coat of zinc chromate primer followed by two coats of aluminum and masonry paint.
 - 2. When in contact with concrete, masonry and plaster, apply to aluminum contact surfaces zinc chromate primer, bituminous paint, aluminum metal and masonry paint or pressure tape.
 - 3. When in contact with wood or other absorptive materials, apply two coats of aluminum house paint to such materials and protect aluminum contact surfaces with bituminous paint.
- H. Provide pendant fixtures with swivel hangers to assure a plumb installation and have a minimum 25° swing from horizontal in all directions. Single unit suspended fluorescent fixtures shall have twin stem hangers. Multiple unit or continuous units shall have a tubing or stem for wiring at one point and tubing provided for each unit length of chassis including one at each end. Tubing shall not be less than 3/16 inch in diameter. Motion of swivels or hinged joints shall not cause sharp bends in conductors or damage to insulation. For heavy pendant mounted fixtures, where support independent of box is required and where conduit and outlet boxes are installed on surface, provide safety swivel hangers with fixture studs.
- I. Install fixtures to be pole mounted in accordance with the manufacturer's recommended installation practices as indicated.
- J. Provide required lamps in each lighting fixture as soon as fixtures are properly installed.

3.2 BALLASTS

- A. Install ballasts, other than those mounted integrally within luminaires, as indicated, and in such a manner that the ballast is protected from weather, moisture, and other atmospheric conditions, and in such a manner that ambient temperature surrounding the ballast will not cause the temperature of the ballast housing hot spot to exceed UL requirements. Voltage drop to lamp, due to remote mounting shall not exceed one percent of the nominal lamp voltage. Secondary ballast conductors for high pressure sodium lamps shall have 1000-volt, high temperature

insulation. When more than one ballast is mounted at one location, the minimum spacing between ballasts shall be 6 inches in a horizontal direction and 12 inches in a vertical direction.

3.3 LIGHT POLES

- A. Install light poles in accordance with the manufacturer's recommended installation practices as indicated.

3.4 CONCRETE BASES

- A. Obtain necessary templates and anchor kits before starting work.

3.5 AUXILIARY LIGHTING EQUIPMENT

- A. Install as indicated and in accordance with manufacturer's instructions.
- B. Anchor firmly in place.
- C. Test and adjust for proper operation in accordance with the manufacturer's instructions.

3.6 LIGHTING CONTROL DEVICES

- A. Install lighting control devices in accordance with the manufacturer's recommended installation practices, and as indicated.
- B. Where indicated, incorporate the components in panelboards behind separate doors and mount them on sound absorbing materials.
- C. Install circuit breaker or fuse protection for the control circuits.
- D. Mount the switches on the strike plate side of the doors.

3.7 FIELD QUALITY CONTROL AND INSPECTION

- A. Inspect luminaires, lamps and associated hardware prior to and after installation to confirm that they are of the quality and type as specified herein and as indicated, and are free of defects and damage.
- B. Provide luminaires and lighting equipment to the project site complete, with suspension accessories, canopies, hickey, castings, sockets, holders, reflectors, ballasts, diffusing materials, louvers, frames, recessing boxes, and related items, completely wired and assembled as indicated.
- C. Whenever practicable, test lighting systems at the same time that the distribution panelboard or switchboard is tested.

- D. Adjust floodlights in accordance with the aiming chart provided by the manufacturer. Make adjustments during darkness to obtain the optimum lighting levels throughout.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

APPENDIX A

HAZARDOUS MATERIALS SURVEYS:

RIVERSIDE CARHOUSE – GENERAL

By Cardno ATC



**HAZARDOUS MATERIALS INSPECTION
MBTA CONTRACT Z92PS54
WORK PLATFORMS FOR RIVERSIDE, RESERVOIR, LAKE
STREET, AND MATTAPAN CARHOUSES**

**RIVERSIDE CARHOUSE
325 GROVE STREET
NEWTON, MASSACHUSETTS**

CARDNO ATC PROJECT NO. 060.00962.0021

September 6, 2013

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APPENDIX B

ASBESTOS BULK SAMPLE ANALYSIS RESULTS BY PLM
INVENTORY AND COST ESTIMATE FOR OTHER HAZARDOUS
MATERIALS

1.0 EXECUTIVE SUMMARY

Cardno ATC of Woburn, Massachusetts was retained by Baker | Wohl Architects to conduct an inspection and sampling for asbestos-containing material, a lead paint determination, and an inspection for other hazardous materials that may be impacted by proposed renovations of the MBTA Riverside carhouse located at 325 Grove Street, Newton, Massachusetts. The inspections were limited to building components or systems that may be impacted by the installation of new work platforms and other facility upgrades as defined by Baker | Wohl Architects for MBTA Contract Z92PS54 Work Platforms for Riverside, Reservoir, Lake Street, and Mattapan Carhouses.

1.1 Asbestos

Section 2.0 discusses the asbestos-containing materials (ACM) survey and sampling methodology. This survey involved a visual inspection, bulk sampling and inventory of suspect ACMs, including locating and quantifying the identified ACM.

The asbestos survey was performed by Massachusetts Department of Labor Standards (DLS) certified Asbestos Inspector, Mr. Michael Tiernan (AI-900286), on August 9, 2013. A total of forty-eight (48) samples of suspect ACM were collected with forty-five (45) analyzed to determine asbestos content. The Cardno ATC inspector performed both the visual inspection and bulk sampling in the building according to methods outlined in the U.S. Environmental Protection Agency (EPA) guidance document titled, "Guidance for Controlling Asbestos-Containing Materials in Buildings" (Document No. 560/5-85-024). Please find the Asbestos Identification Lab Polarized Light Microscopy (PLM) bulk sample results included as Appendix A.

Laboratory analysis has determined that the cementitious ceiling panels located in the basement, black mastic associated with the 12" white/blue fleck floor tile and the black mastic associated with the 12" white/tan fleck floor tile are ACM. The estimated cost to remove the identified ACMs from the building is **\$33,600.00**.

1.2 Lead Containing Paint Determination

Cardno ATC performed a lead paint determination on representative interior painted surfaces that will be impacted by the proposed renovation project. The lead paint testing was performed using X-Ray Fluorescence (XRF) Analysis using an RMD Lead Paint Analyzer.

Results of the lead determination indicate that lead is present on interior walls, wood, metal, concrete, and various other building components such as doors and windows. Note that contractors performing work at the building where the painted surfaces will be disturbed must comply with the Occupational Safety and Health Administration (OSHA) 29 CFR 1926.62, Lead in Construction. Additional waste disposal requirements may apply in accordance with EPA and MA DEP regulations. Table IV, found in Section 3.2 presents the findings of Cardno ATCs lead determination.

The cost for renovation/demolition of building components coated with lead paint is approximately **10-15%** above the cost for general demolition.

1.3 PCB, Mercury, and Other Hazardous Materials Survey

Cardno ATC performed a Hazardous Materials survey within accessible areas of the Site building, which is scheduled for renovation. The survey was performed by Mr. Sam Sander, Cardno ATC Field Geologist. The objective of the hazardous materials survey was to evaluate the presence of polychlorinated biphenyl (PCB)-containing ballasts and electrical equipment, mercury-containing electrical and building components, and other potential hazardous materials, such as chemicals or refrigerants that will require disposal as part of the proposed renovation project. The scope of work for this project did not include inspection of the Site for the presence of underground tanks or other underground structures that may contain hazardous materials. Sealants suspected to contain PCBs were sampled and submitted for laboratory PCB analysis. The results of the limited PCB sealant survey are discussed in a separate report

Various hazardous material-containing building components and items were observed within the surveyed areas and included in the survey tables. It is assumed that some of the observed items, such as computer equipment and cleaning/maintenance products in containers, will not require removal and disposal because it is presumed that they will be removed from the Site building prior to renovation/demolition activities. The inspection and results are discussed in Section 4.0. This survey is representative only of items present as of the date of the survey. The estimated cost to dispose of identified hazardous materials is approximately \$3,200, which includes a 15% contingency.

Limitations

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with customary principles and practices in the field of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.

Environmental evaluations are limited in the sense that conclusions and recommendations are developed and information obtained from limited research and secondary sources. Except as set forth in this report, Cardno ATC has made independent investigations as to the accuracy or completeness of the information derived from the secondary sources and personal interviews and has presumed that such information was accurate and complete.

This report is intended for the sole use of Baker/Wohl Architects. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at risk of said user.

CERTIFICATION OF RESULTS

This report has been prepared for the exclusive use of Baker | Wohl Architects. Photocopying of this document by parties other than those designated by the Client, or use of this document for purposes other than it is intended, is prohibited.

Respectfully submitted this 6th day of September, 2013

Cardno ATC



Michael Tiernan
Project Manager



Kevin F. Drinan
Manager, Industrial Hygiene Services

2.0 ASBESTOS CONTAINING MATERIALS SURVEY

2.1 Sampling Methodology

The survey was performed by an EPA-accredited and Massachusetts DLS certified Asbestos Inspector on August 9, 2013. Bulk samples, representing individual homogeneous areas of suspect materials, were collected in a randomly distributed manner, in accordance with the methods outlined below.

Building materials exist in the form of thermal systems insulation (TSI), surfacing materials and miscellaneous materials.

The following generally illustrates the sampling strategy employed by Cardno ATC where feasible:

- (a) Surfacing materials – In a randomly distributed manner, collect bulk samples of surfacing materials, representative of each homogeneous area, and not assumed to be ACM.
 - (1) Collect at least three bulk samples from each homogeneous area that is less than or equal to 1,000 ft².
 - (2) Collect at least five bulk samples from each homogeneous area that is greater than 1,000 ft², but less than or equal to 5,000 ft².
 - (3) Collect at least seven bulk samples from each homogeneous area that is greater than 5,000 ft².
- (b) Thermal systems insulation- In a randomly distributed manner, collect at a minimum, three bulk samples of thermal systems insulation material, representative of each homogeneous area, and not assumed to be ACM.
 - (1) Collect, at a minimum, one bulk sample of patched thermal systems insulation, representative of each homogeneous area, and not assumed to be ACM, providing the section of patch was less than 6 linear or square feet.
 - (2) Collect, at a minimum, three representative bulk samples of each insulated mechanical system not assumed to be ACM, including, but not limited to cementitious material used on pipe fittings such as tees, elbows or valves. Representative sampling was conducted in a manner sufficient as to identify whether each homogeneous area is either asbestos or non-asbestos containing.
 - (3) Bulk samples are not required to be collected from any homogeneous area where the accredited asbestos inspector has determined that the thermal systems insulation is a non-suspect material (i.e. fiberglass, foam glass, rubber or any other non-ACM).
- (c) Miscellaneous materials – Collect, at a minimum, two representative bulk samples of each miscellaneous material not assumed to be ACM, including but not limited to ceiling tiles, floor tiles, associated floor mastic, etc. Representative sampling was conducted in a manner sufficient as to identify whether each homogeneous area is either asbestos or non-asbestos containing.

2.2 Asbestos-Containing Materials

Cardno ATC conducted the asbestos survey of all interior areas that may be impacted by the planned renovation project. Cardno ATC's scope of work included bulk sampling of suspect materials prior to renovation activities. Appropriate efforts were made in representative areas of the building, to identify multiple layers of flooring systems, as well as any suspect materials located within wall cavities, chases, plenums and above suspended ceiling systems. Note that Cardno ATC did not perform exploratory demolition in an attempt to identify concealed suspect building materials. Please note that Cardno ATC did not disassemble mechanical equipment or electrical gear that may have suspect ACM internal components.

The following table presents a list of the identified, confirmed ACM at the site building at 325 Grove Street, Newton, MA. Note that an ACM is defined by the US EPA as any material or product containing more than one percent asbestos by weight, or one percent or greater according to the Massachusetts DEP.

**Table 1: Summary of Identified Asbestos-Containing Materials
MBTA Riverside Carhouse**

Material	Location(s)	Quantity Observed	Condition	Result
Asbestos Cement Panels	Basement Ceiling	1,600 SF	Good	10% Chrysotile
Black Mastic on 12" White/Blue Fleck Floor Tile	Mezzanine Uni-sex Bathroom	20 SF	Good	2% Chrysotile
Black Mastic on 12" White/Tan Fleck Floor Tile	Mezzanine Hallway outside Locker Room/Break Room	300 SF	Good	5% Chrysotile

The following table presents cost estimates for removal of the identified ACMs.

**Table 2: Cost Estimates for Removal of Identified Asbestos-Containing Materials
MBTA Riverside Carhouse**

Material	Location(s)	Estimated Quantity	Unit Price	Total Cost
Transite	Basement Ceiling	1,600 SF	\$20/SF	\$32,000
Black Mastic on 12" White/Blue Fleck Floor Tile	Mezzanine Uni-sex Bathroom	20 SF	\$5/SF	\$100
Black Mastic on 12" White/Tan Fleck Floor Tile	Mezzanine Hallway outside Locker Room/Break Room	300 SF	\$5/SF	\$1,500
Total estimated cost for removal of identified ACM				\$33,600.00

The following table lists the suspect materials identified that were sampled and determined to be non-ACM.

**Table 3: Summary of Non-ACM Materials
MBTA Riverside Carhouse**

Material	Location(s) Sampled
White Crack Filler on Concrete Floor	Platform 2-3, Platform 6-7, Platform 8-9
Grey Crack Filler on Concrete Floor	Platform 2-3, Platform 8-9, HPCU Room
Black Crack Filler on Concrete Floor	Top of Platform 6-7
Stanchion Sealant	Base of Support Column Pit/Rail 9
Stair Runner Caulking	Mezzanine Stairs
Grey Interior Door Caulking	Basement Green Exit Door, Basement Battery Room
Grey Duct Sealant	Mezzanine above HPCU Room
Brown Cove Base Mastic	Mezzanine Hallway
2' x 2' Ceiling Tile	Mezzanine Hallway
2' x 2' "Rough" Ceiling Tile	Mezzanine Freight Elevator Room
2' x 4' Ceiling Tile	Bathroom
2' x 4' Ceiling Tile	Mezzanine Locker Room
Sheetrock	HPCU Room Ceiling
Joint Compound	HPCU Room Ceiling, Mezzanine above HPCU Room
Composite Board	Mezzanine Stairs between I-Beam and CMU Wall
Yellow Glue behind Metal Wall Panels	HPCU Room
*12" White/Blue Fleck Floor Tile	Mezzanine Uni-sex Bathroom
*12" White/Tan Fleck Floor Tile	Mezzanine Hallway
12" Green Floor Tile and associated Yellow Mastic	Mezzanine Office above HPCU Room, Mezzanine Freight Elevator Room

***Material should be treated as ACM due to the asbestos-containing mastic.**

2.3 Analytical Method

Bulk samples of suspect materials were analyzed by ProScience Analytical Services, Inc., of Woburn, Massachusetts (ProScience) using the EPA approved method (EPA/600R-93/116) for polarized light microscopy with dispersion staining (PLM/DS), using the visual estimation technique for asbestos quantification. By using the PLM/DS method, a trained microscopist is able to identify and distinguish between asbestos group minerals and other fibrous materials such as cellulose (paper), mineral (rock), wood or glass fiber. The quantity of each of these substances is estimated on a weight basis and recorded as a percent. Only the asbestos content, if any, is recorded in the bulk sample 'Report of Analysis' (Appendix A). If a material contains or is greater than 1% asbestos, it is considered to be asbestos-containing material. Upon client request, or at the recommendation of the analyst, the 'Point Counting Method' may be used to verify the presence/absence of asbestos when a sample contains less than 10% asbestos by visual estimate.

ProScience is certified by the Massachusetts DLS (certification #AA 000156) to perform all types of asbestos analysis. ProScience, is also accredited by the EPA National Voluntary Laboratory Accreditation Program (NVLAP). The PLM/DS analytical method is modeled after 40 CFR Part 763, Subpart F, Appendix A: "Interim Method for the Determination of Asbestos in Bulk Insulation Samples."

2.4 Consideration for Hidden Materials

Cardno ATC recommends that if a suspect material has not been positively identified, but is similar in mode of occurrence or physical properties as other identified ACM, it should be considered asbestos-containing. Only through further sampling and analysis should a suspect material be identified as non-asbestos.

2.5 Recommendations

It is Cardno ATC's understanding that the carhouse is scheduled for renovations. All ACM should be properly removed and disposed by a licensed Asbestos Contractor prior to disturbance.

This inspection was conducted in accessible areas of the building where building components will be disturbed as part of the planned renovation project. Cardno ATC recommends that precautions be taken to prevent unauthorized disturbance of identified and assumed ACM in this report. Cardno ATC recommends that a Massachusetts licensed Asbestos Contractor perform additional exploratory demolition in hidden/concealed areas where ACMs may exist. Cardno ATC also recommends the following as part of the abatement process:

1. Although the asbestos contractor is required to follow the requirements outlined in Federal, Massachusetts State, and local regulations regarding asbestos during any abatement project, Cardno ATC recommends the development of a project specification and the use of project oversight to ensure compliance with all applicable regulations as well as protect the interest of the client for all abatement work performed at the Site. The project specification shall reference the regulations pertinent to each project, including those work procedures that shall be followed by asbestos abatement personnel.
2. As part of each abatement contractor bidding process, a unit price schedule for the abatement of asbestos-containing materials should be established. The unit price schedule should include costs for those materials identified within this report, as well as those materials that may potentially be uncovered during renovation/demolition activities. Included should be unit prices for the removal of asbestos-containing materials (i.e. caulking/sealants, floor tile, floor tile mastic, etc.), as well as those non-asbestos-containing materials which may be asbestos contaminated (i.e. carpeting, plywood, etc.)
3. Project oversight will provide Baker/Wohl Architects with on-site technical expertise during all phases of the abatement work. Project oversight provides a constant management of the abatement project to ensure that all identified asbestos-containing materials are removed in accordance with all applicable regulations and to prevent an asbestos fiber release. Tasks performed during project oversight should include periodic work inspections to ensure that all

procedures employed by the abatement contractor are acceptable, and air monitoring around each work area to detect elevated asbestos fiber levels.

3.0 LEAD CONTAINING PAINT DETERMINATION

Cardno ATC performed a limited lead-containing paint (LCP) determination on representative interior and exterior painted surfaces that are to be impacted by demolition. The lead determination was performed by Cardno ATC's Massachusetts licensed Lead Paint Inspector/Risk Assessor, Mr. Frank Bifano (Lic. No.3240). The lead paint testing was performed via X-Ray Fluorescence (XRF) Analysis, using an RMD Lead Paint Analyzer.

3.1 Testing Procedures - RMD LPA-1 XRF Analyzer

The RMD Lead Paint Analyzer is a complete lead paint analysis system, which quickly, accurately and non-destructively measures the concentration of Lead Paint on surfaces. The RMD relies on the measurement of the L-shell and K-shell X-rays to determine the amount of lead present in the painted surface. K-shell X-rays can penetrate many layers of paint and allow a good measurement of the lead content of paint to be made without being significantly affected by the thickness or number of layers of paint on the surface of the sample. L-shell X-rays have less penetration and provide a measurement of the surface level lead content of paint.

The RMD has the ability to analyze and compute corrections for the differences in the energy spectrums relating to different substrates. This analysis of the energy spectrum means that the lead paint reading displayed on the instrument already accounts for any substrate effects and no correction is required by the operator.

Upon arrival at the job site, a "validation test" was performed to assure that the instrument was operating properly. A series of three test measurements using the nominal time which was used during the inspection were taken on the NIST Paint Film Standard (SRM No. 2579) as required by the instrument's Performance Characteristic Sheet (PCS). The individual readings and an average of the three readings were recorded and compared to the standards. In all cases the instrument was functioning within the standard deviation as defined by the manufacturer and the PCS. All validation readings were recorded in the field data of each unit where validation tests were performed. If for any reason the XRF does not pass the quality control procedures, it is Cardno ATC's policy to replace that instrument with an XRF that passes the above criteria for calibration.

3.2 Summary of Findings

The following XRF readings are in milligrams per square centimeter (mg/cm²).

**Table 4: Components Tested via XRF
MBTA Riverside Carhouse**

AREA./ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
First Floor				
Platform 2 & 3:				
	Under Floor Horizontal Rail	Metal	White	>9.9
	Rail	Metal	Dark Red	9.0
	Support Column	Metal	Black	7.7
	Floor Edge	Metal	White	0.0
	Floor	Concrete	Yellow	2.8
Platform 6 & 7:				
	Under Floor Horizontal Rail	Metal	White	5.0
	Support Column	Metal	White	4.8
	Floor Edge	Metal	White	0.7
	Floor	Concrete	Yellow	0.4
Platform 8:				
	Stair Tread	Concrete	Yellow	-0.1
	Stair Riser	Concrete	White	-0.1
	Upper Horizontal Rail	Metal	White	-0.1
	Lower Horizontal Rail	Metal	White	2.2
	Round Support Column	Metal	White	0.4
	Side Wall	Concrete	White	-0.2
	Side Track	Metal	White	0.7
	Large Support Column	Metal	White	5.6
Platform 9: (Under Floor Level)				

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
	Upper Horizontal Rail	Metal	White	0.0
	Lower Horizontal Rail	Metal	White	8.8
	Support Column	Metal	White	3.9
	Small Stairs	Wood	Yellow	0.8
Platform 9: (Floor Level)				
	Stripe	Concrete	Yellow	0.2
	Floor Edge	Concrete	White	0.2
Platform 9: (Upper Platform)				
	Stairs	Wood	Yellow	0.4
	Hand Rail	Metal	Orange	-0.0
HPCU Room:				
	Double Door	Metal	White	-0.0
	Double Door Frame	Metal	White	-0.0
	Floor	Concrete	Gray	-0.2
	Support Pole	Metal	White	0.2
	Door	Metal	White	-0.0
	Door Frame	Metal	White	0.2
	Ceiling	Gypsum	White	-0.0
Men's Bathroom:				
	Interior Wall	Ceramic Tile	White	1.2
	Wall	Ceramic Tile	Tan	0.0
	Sink	Metal	White	0.7
	Door	Metal	Gray	-0.2
	Door Frame	Metal	Gray	0.0
	Exterior Wall	Cinder Block	White	-0.0
	Vertical Beam	Metal	White	2.6
	Wall	Concrete	Tan	-0.2

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
Basement				
Corridor:				
	Wall	Concrete	White	-0.1
	Wall	Cinder Block	White	0.0
	Ceiling Frame	Metal	White	-0.2
	Double Door	Metal	Gray	-0.2
	Double Door Frame	Metal	Gray	-0.0
	Double Door	Metal	Blue	-0.1
	Double Door Frame	Metal	Blue	-0.0
	Elevator Door	Metal	Blue	-0.2
	Elevator Door Frame	Metal	Blue	-0.2
	Lower Wall	Concrete	Blue	0.3
	Stairs to Egress Door	Metal	Blue	1.6
	Stair Railing	Metal	Light Green	1.9
	Egress Door	Metal	Green	0.5
	Egress Door Frame	Metal	Green	0.3
	Ceiling Air Vent	Metal	Gray	-0.0
Stairs – 1st Floor to Mezzanine				
	Wall	Cinderblock	Gray	0.0
	Horizontal Beam	Metal	Gray	1.8
	Vertical Beam	Metal	Gray	6.6
	Door	Metal	Gray	-0.0
	Door Frame	Metal	Gray	-0.1
Mezzanine				
Hallway:				
	Wall	Cinderblock	Yellow	-0.1
	Wall	Cinderblock	White	-0.0

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
	Door	Metal	Gray	-0.0
	Door Frame	Metal	Gray	0.0
Bathroom:				
	Door	Metal	Brown	0.0
	Door Frame	Metal	Brown	0.0
	Wall	Cinderblock	White	-0.1
	Pipe	Metal	White	-0.2
Men's Locker Room:				
	Wall	Ceramic Tile	Tan	-0.2
	Partition	Metal	Tan	-0.0
	Door	Metal	Brown	-0.2
	Door Frame	Metal	Brown	0.6
Freight Elevator Room:				
	Elevator Door	Metal	Gray	-0.1
	Elevator Door Frame	Metal	Gray	-0.1
	Wall	Cinderblock	White	-0.1
	Wall	Plaster	White	0.5
	Closet Door	Metal	White	-0.1
	Closet Door Frame	Metal	White	-0.1
	Double Door Frame	Metal	White	-0.1
Mezzanine Above HPCU Room				
Stairs 1 st Floor to Mezzanine:				
	Stair Wall	Gypsum	White	0.0
	Stair Cap	Wood	White	-0.2
	Stair Handrail	Wood	Stain	-0.0
Mezzanine Hallway:				
	Wall	Gypsum	White	0.0

AREA:/ROOM:	COMPONENT	SUBSTRATE	COLOR	XRF RESULTS
	Door	Metal	White	-0.1
	Door Frame	Metal	White	-0.0
	Interior Window Frame	Wood	White	-0.0
Break Room:				
	Wall	Gypsum	White	-0.0
	Ceiling	Gypsum	White	-0.0
	Door	Metal	White	-0.1
	Door Frame	Metal	White	-0.1
Office:				
	Wall	Gypsum	White	0.0
	Ceiling	Gypsum	White	0.0
	Door	Metal	White	-0.1
	Door Frame	Metal	White	0.0

3.3 Regulatory Implications and Regulations

The implications of lead paint existing in a non-residential building are related to the future use of the facility and the need to impact these painted surfaces during the renovation and demolition process.

The Occupational Safety and Health Administrative (OSHA) does not acknowledge any quantitative threshold for a lead-based paint. Paint with a detectable amount of lead, regardless of the level, is recognized as a lead-containing paint. The possible exposure hazard to workers impacting these coated surfaces should be assessed and contractors and their employees must adhere to the OSHA Lead in Construction standard found at 29 CFR 1926.62. Although OSHA does not recognize negative XRF results as proof that paint does not contain lead, the use of XRF is an efficient real time screening technique for identifying lead-containing paints. To comply with OSHA requirements, a negative XRF result would have to be confirmed by other approved methods. Positive XRF results do not need to be confirmed. Regardless of analytical results, OSHA still requires that personal exposure monitoring be conducted when appropriate to determine lead exposure, even for zero results as determined by any method. To fully comply with EPA regulations, sampling of demolition debris waste streams may be required, depending on the requirements of the receiving facility.

OSHA recognizes that construction type work on surfaces coated with lead-containing paint has a potential to expose workers to hazardous levels of lead and requires that appropriate safety and health measures be followed as stated in 29 CFR 1926.62. OSHA states that

until the employer performs an exposure assessment and documents that employees are not exposed above the permissible exposure limit (PEL) of greater than 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of air, the employer must treat employees as if they were exposed above the PEL for the following operations:

- Manual renovation and demolition of structures, manual scraping, manual sanding, and use of heat gun where lead-containing coatings or paints are present;
- Abrasive blasting;
- Power tool cleaning;
- Lead burning;
- Using lead-containing mortar or spray painting with lead-containing paint;
- Abrasive blasting, rivet busting, or welding, cutting, or burning on any structure where lead-containing coatings or paint are present;
- Cleanup activities where dry expendable abrasives are used; and
- Any other task the employer believes may cause exposure in excess of the PEL.

Work precautions include providing respiratory protection, protective work clothing and equipment, change areas, hand washing facilities, biological monitoring, and training until an exposure assessment has determined that the work activity will result in a exposure below the PEL. Additional requirements under this standard include a written compliance program as well as record keeping.

3.4 Waste Disposal Sampling and Analysis

Waste disposal is governed by the Federal Resource Conservation and Recovery Act (RCRA) regulations, which distinguish between solid wastes and hazardous wastes. Solid wastes include general construction debris and are subject to minimum handling, transportation, and landfill disposal requirements under RCRA regulations. Hazardous wastes, including certain lead-containing materials, are subject to restrictions designed to prevent the hazardous materials from entering the environment. Lead waste is classified as hazardous or non-hazardous based on the results of the Toxic Characteristic Leachate Procedure (TCLP) testing. The leachability test measures whether or not lead leaches from the waste in excess of the regulated level of 5.0 mg/L. If the results of the TCLP analysis exceed this level, the waste must be handled, transported and disposed as a hazardous waste in an approved waste site, reclamation facility or incinerator site.

Cardno ATC recommends removal and recycling of any metal leaded components prior to demolition. These metal components are exempt from the requirements of the Resource Conservation and Recovery Act (RCRA) since it is not considered a waste. Cardno ATC recommends a receipt a receipt or bill of lading from the recycling facility stating that the metal was accepted and purchased by the facility.

3.5 Cost Estimates

The estimated costs for the removal or remediation of lead containing painted components prior to renovation or demolition at the Riverside Carhouse is approximately **10-15%** above the cost for general renovation or demolition. This cost includes contractor record-keeping requirements, personal protection of workers, and possible isolation of the work area to comply with the OSHA Lead Standard (29 CFR 1926.62) and DLS 454 CMR 22.11.

Additional costs may include disposal of some of the debris as hazardous waste depending on the results of TCLP testing.

4.0 PCB, MERCURY AND OTHER HAZARDOUS MATERIALS (OHM) SURVEY

A hazardous materials survey was conducted on August 9, 2013 by Mr. Sam Sanders, Cardno ATC Field Geologist. The survey consisted of a visual inspection of portions of accessible interior areas of the Site building, which are scheduled for renovation. This included the maintenance area, the bathrooms, the hydraulic pressure control unit (HPCU) room, the mezzanine, and portions of the mezzanine, and the basement (corridor and mechanical rooms), the roof, and exterior areas around the building. The roof and exterior areas of the Site building were not included in the scope, other than in regards to specifics in the proposal and Baker | Wohl provided documentation.

4.1 Objective

The objective of the hazardous materials survey was to evaluate the presence of PCB-containing ballasts and electrical equipment, mercury-containing electrical components, refrigerant-containing equipment, equipment that could contain chemicals, and other potential hazardous materials including chemicals or unlabeled containers that may require disposal as part of the renovation of the Site building.

4.2 Scope of Work

During the survey inspection, each accessible room/area was visually inspected for the presence of hazardous materials that will need to be properly disposed prior to renovation activities. Any potential hazardous materials in building fixtures/appliances found during the survey were visually inspected and the item, condition, quantity, and area location were noted. The results of the survey are noted in the following section. Cardno ATC's scope of work did not include inspection or other services associated with subsurface soil or groundwater, underground storage tanks, oil/water separators, or subsurface site contamination.

4.3 Results

A list of potentially hazardous materials or items suspected to contain hazardous materials, as observed during the survey, is included in the table attached in Appendix C. Cardno ATC provides survey results per room in the table.

Certain electrical components such as resistors, small dry-type transformers, and computer circuit boards do not contain large quantities of hazardous materials but their recycling is encouraged by government agencies. Larger white goods and electrical components should be recycled per applicable local, state, and federal regulations.

A summary of several main categories of items containing hazardous materials is included in the following subsections.

4.3.1 Fluorescent Light Ballasts

Fluorescent light fixture ballasts manufactured prior to 1979 may contain small quantities of PCBs. Recently manufactured fluorescent light ballasts do not contain PCBs and those manufactured between 1978 and 1998 were required to have "No PCBs" labels. Light ballasts that do not have "No PCBs" labels, unless known to be manufactured since 1998, should be treated as PCB-containing and handled/disposed of accordingly.

A total of approximately 58 fluorescent light ballasts were observed by Cardno ATC. Cardno ATC inspected representative ballasts in the surveyed area. Approximately 43 of the observed ballasts were labeled as "No PCBs" and the remaining 15 were unlabeled. Ballasts that are not labeled are presumed to contain PCBs and require special management. The possibility exists that ballasts which are PCB-containing exist in areas which Cardno ATC did not inspect or did not have access to due to the location of the ballasts or the condition of the light fixture covers. The results of the fluorescent light ballast inspection and inventory are included in the table in Appendix C.

4.3.2 Fluorescent and High Intensity Light Bulbs

Fluorescent and high intensity light bulbs may contain small amounts of heavy metals such as mercury, lead, cadmium, and nickel, and therefore must be handled/disposed of properly. An inventory of fluorescent and high intensity light bulbs in the surveyed areas was conducted. A total of approximately 114 fluorescent light bulbs were observed by Cardno ATC. The results of the fluorescent and high intensity light bulb inventory are included in the table in Appendix C.

4.3.3 Other Potential PCB-Containing Equipment

In some cases, "wet-type" electrical transformers contain transformer oil (also known as dielectric fluid) that may contain PCBs and therefore must be handled/disposed of properly. "Dry-type" electrical transformers, on the other hand, contain no transformer oil. Cardno ATC observed no transformers located in the areas scheduled for renovation. Cardno ATC did observe transformers in other areas around the Site building.

Hydraulic systems contain hydraulic fluid (typically petroleum-based) that may contain PCBs and must be handled/disposed of properly. Cardno ATC did not observe any hydraulic systems within building areas scheduled for renovation. A hydraulic pressure control unit (HPCU) and a hydraulic elevator were observed in the building. Cardno ATC understands that removal and replacing of the hydraulic systems are not included in the project and associated costs are not included herein.

Note that electrical cabinets containing electrical switches, breakers, and other electrical equipment were located in multiple throughout the building. Due to safety and logistical reasons, the cabinets were not opened during the hazardous material survey. However, there are typically no hazardous materials or components containing hazardous materials located within these types of common small electrical cabinets.

4.3.4 Caulking

PCBs may be identified in miscellaneous building materials such as caulking, sealants, insulation and sound dampening materials, paint, gaskets, roofing and siding materials, waterproofing compounds and enamel coatings manufactured prior to 1978. In general, the PCBs were used in these materials as plasticizers and/or flame retardants. Although the EPA regulations under Toxic Substance Control Act (TSCA) stipulate procedures by which PCB-contaminated materials must be handled and disposed, the regulations do not require that "non-liquid PCB products," such as caulking, be tested to determine their PCB content. However, TSCA requires that PCB containing materials be properly managed, and if it is determined that these materials do contain PCBs above regulatory thresholds, they must be managed at a proper disposal facility.

Cardno ATC's scope included the analysis of building materials for PCB content in the areas scheduled for renovation. Cardno ATC performed a separate evaluation for the presence of PCB containing materials, provided under separate cover, which provides more details and recommendations for managing detected PCBs in building materials.

4.3.5 Mercury-Containing Electrical Equipment

Thermostats, thermometers, and pressure gauges sometimes contain mercury. In addition, mercury-containing switches were sometimes used on heating boilers. Cardno ATC did not observe suspect mercury-containing equipment in the areas scheduled for renovation.

4.3.6 Above-Ground Storage Tanks

One approximately 250-gallon AST associated with an emergency generator was observed by Cardno ATC outside the Site building. Note that no investigation of potential underground storage tanks or other subsurface structures was part of the scope of work.

4.3.7 Electronic Devices and White Goods

Larger electronic devices and white goods, such as computers, printers, scanners, and microwaves, contain hazardous components that should be recycled or properly disposed. Multiple computers, scanners, microwaves and televisions were observed throughout the Site building. However, Cardno ATC was informed that it could be assumed that the electronic devices and white goods will not require removal and disposal because they are owned by the MBTA and it is presumed that they will be removed prior to renovation activities. These items are not included in the table in Appendix C.

4.3.8 Other Hazardous Materials

One (1) rechargeable battery was observed within the Site building. The battery was associated with an emergency generator. Rechargeable batteries can contain heavy metals such as mercury, lead, cadmium, and nickel that need to be recycled or properly disposed. The inventory of these materials is provided in the table in Appendix C.

Motors and pumps associated with heating, ventilation, and air conditioning (HVAC) equipment and other equipment were observed at the Site. Motors and pumps often contain lubricating oil that needs to be recycled or properly disposed. Approximately six

motors/pumps were observed throughout the Site building areas scheduled for renovation. The inventory of motors/pumps is provided in the table in Appendix C.

4.4 Access Limitations

The survey did not include hazardous materials potentially present in concealed inaccessible area such as walls/ceilings/floor cavities. Facility areas not indicated for demolition or renovation were not included in this survey. Cardno ATC recommends that prior to renovation activities, any areas that were not accessed at the time of the survey should be inspected to determine the presence of containers or building materials containing hazardous materials.

4.5 Conclusions

Various fluorescent light ballasts, light bulbs, motors/pumps containing lubricating oil, equipment containing refrigerants, an AST and a rechargeable battery were observed by Cardno ATC within the surveyed areas scheduled for renovation. It is assumed that some of the observed items, such as televisions/computers/scanners, will not require removal and disposal because it is presumed that they will be removed from the Site building prior to renovation activities. Care should be taken when handling the inventoried materials. The materials should be disposed according to applicable local, state, and federal regulations.

The estimated cost to dispose identified hazardous materials is approximately \$3,200, which includes a 15% contingency. This cost estimate was developed with the following assumptions:

- Only hazardous materials visually observed during the survey are included; and
- No significant hidden hazardous materials are discovered at a later time.

Our professional services have been performed and our findings obtained and prepared in accordance with customary principles and practices in the field of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated. Environmental evaluations are limited in the sense that conclusions are developed and information obtained from limited research and secondary sources. Except as set forth in this report, Cardno ATC has not made independent investigations as to the accuracy or completeness of the information derived from the secondary sources and personal interviews, and has presumed that such information was accurate and complete. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings or conclusions is at risk of said user.

APPENDIX A

ASBESTOS BULK SAMPLE ANALYSIS RESULTS BY PLM



ProScience Analytical Services, Inc

Doug Rader
Cardno ATC, Woburn
600 West Cummings Park
Suite 5450
Woburn, MA 01801

August 21, 2013

Dear Doug Rader,

The enclosed analytical results have been obtained by using the EPA/600/R-93/116 method. The "Visual Estimate" quantitative method is generally used for determining the percentage of asbestos and other components of the sample. "The Point Counting" method may also be used upon client request or at the analyst discretion. The Point Count method is usually recommended when the sample contains less than 10% asbestos by Visual estimate. Asbestos content less than 1% is recorded on the report as TR (trace).

The Quality Control data related to the samples analyzed is available upon client's written request. ProScience Analytical Services Inc., assumes no responsibility for potential sample contamination that may have occurred during the sample collection process or erroneous data provided by the client.

The enclosed results may not be used under any circumstances as product endorsement by any US government agency including NIST/NVLAP.

All Laboratory records are retained for at least three years unless otherwise directed in writing by the client. The actual samples are retained for a period of two months and written request is necessary in order to be retained for a longer period of time. All analytical results and records are considered strictly confidential and will not be released under any circumstances to anyone except the actual client. The analytical results included in this report apply only to the items tested.

If you have any questions please contact the Laboratory Manager or the Laboratory Director.

Sincerely,

Stefanie Bishop, Optical Asbestos Manager

Aimee Cormier, Laboratory Director

Enclosure:

Version 2

LAB BATCH ID: B 87809 CLIENT PROJECT ID: 60.00962.0021

Client Ref: MBTA - Riverside

AIHA ID# 102754; CT ID# PH-0209; MA ID# AA000156; ME ID# LB-055; ME ID# LA-056; NVLAP

Lab Code 200090-0; RI ID # AAL-093; VT ID# AL016876

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 PO #: N/A
 Client Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: B87809
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %							
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON	
01A	White	0	0	0	0	0	0	0	0	0	0	0	3	97	

Description: White Crack Filler
 Location: Platform 2-3
 Comments: Recommend TEM analysis.

Is asbestos present? No. Analyzed: Yes

Sample ID	Color	Asbestos %						Non-Asbestos %							
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON	
01B	Multi	0	0	0	0	0	0	0	0	0	0	0	3	97	

Description: White Crack Filler
 Location: Platform 6-7
 Comments: Recommend TEM analysis.

Is asbestos present? No. Analyzed: Yes

Sample ID	Color	Asbestos %						Non-Asbestos %							
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON	
01C	Multi	0	0	0	0	0	0	0	0	0	0	0	3	97	

Description: White Crack Filler
 Location: Platform 8-9
 Comments: Recommend TEM analysis.

Is asbestos present? No. Analyzed: Yes

Sample ID	Color	Asbestos %						Non-Asbestos %							
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON	
02A	Gray	0	0	0	0	0	0	0	0	0	0	0	3	97	

Description: Gray Crack Filler
 Location: Platform 2-3
 Comments: Recommend TEM analysis.

Is asbestos present? No. Analyzed: Yes

Sample ID	Color	Asbestos %						Non-Asbestos %							
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON	
02B	Gray	0	0	0	0	0	0	0	0	0	0	0	3	97	

Description: Gray Crack Filler
 Location: Platform 8-9
 Comments: Recommend TEM analysis.

Is asbestos present? No. Analyzed: Yes

Sample ID	Color	Asbestos %						Non-Asbestos %							
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON	
02C	Gray	0	0	0	0	0	0	0	0	0	0	0	3	97	

Description: Gray Crack Filler
 Location: HPCU Room
 Comments: Recommend TEM analysis.

Is asbestos present? No. Analyzed: Yes

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 #: N/A
 Client Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: B87809
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
03A	Multi	0	0	0	0	0	0	0	0	0	0	0	3	97
Description: Black Crack Sealant - Painted Yellow Location: Top of Platform 6-7 Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
03B	Multi	0	0	0	0	0	0	0	0	0	0	0	3	97
Description: Black Crack Sealant - Painted Yellow Location: Top of Platform 6-7 Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
04A	Gray	0	0	0	0	0	0	0	0	TR	0	0	0	100
Description: Stanchion Sealant Location: Base of Column - Pit/Rail 9 Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
04B	Gray	0	0	0	0	0	0	0	0	TR	0	0	0	100
Description: Stanchion Sealant Location: Base of Column - Pit/Rail 9 Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
05A	Gray	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Stair Runner Caulking Location: Mezzanine Stairs Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
05B	Gray	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Stair Runner Caulking Location: Mezzanine Stairs Comments:														
Is asbestos present? No.													Analyzed: Yes	

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 PO #: N/A
 Client Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: B87809
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
06A	Gray	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Gray Interior Door Caulk Location: Basement - Green Exit Door Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
06B	Gray	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Gray Interior Door Caulk Location: Basement - Battery Room Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
07A	Gray	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Gray Duct Sealant Location: Mezzanine - above HPCU Room Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
07B	Gray	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Gray Duct Sealant Location: Mezzanine - above HPCU Room Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
08A	Brown	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Brown Cove Base Mastic Location: Mezzanine Hallway Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
08B	Brown	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Brown Cove Base Mastic Location: Mezzanine Hallway Comments:														
Is asbestos present? No.													Analyzed: Yes	

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 # : N/A
 Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: **B87809**
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
09A	Tan	0	0	0	0	0	0	30	0	60	0	0	0	10
Description: 2x2 Ceiling Tile Location: Mezzanine Hallway Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
09B	Tan	0	0	0	0	0	0	30	0	60	0	0	0	10
Description: 2x2 Ceiling Tile Location: Mezzanine Hallway Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
10A	Gray	0	0	0	0	0	0	0	90	0	0	0	0	10
Description: 2x2 Rough Ceiling Tile Location: Mezzanine Freight Elevator Room Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
10B	Gray	0	0	0	0	0	0	0	90	0	0	0	0	10
Description: 2x2 Rough Ceiling Tile Location: Mezzanine Freight Elevator Room Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
11A	Brown	0	0	0	0	0	0	30	0	60	0	0	0	10
Description: 2x4 Ceiling Tile Location: Bathroom Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
11B	Brown	0	0	0	0	0	0	30	0	60	0	0	0	10
Description: 2x4 Ceiling Tile Location: Bathroom Comments:														
Is asbestos present? No. Analyzed: Yes														

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 PO #: N/A
 Client Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: **B87809**
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
12A	Tan	0	0	0	0	0	0	30	0	60	0	0	0	10
Description: 2x4 Ceiling Tile Location: Mezzanine Locker Room Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
12B	Tan	0	0	0	0	0	0	30	0	60	0	0	0	10
Description: 2x4 Ceiling Tile Location: Mezzanine Locker Room Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
13A	Gray	0	0	0	0	0	0	0	0	5	0	0	0	95
Description: Sheetrock Location: HPCU Room - Ceiling Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
13B	Gray	0	0	0	0	0	0	0	0	5	0	0	0	95
Description: Sheetrock Location: HPCU Room - Ceiling Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
14A	Beige	0	0	0	0	0	0	0	0	TR	0	0	0	100
Description: Joint Compound Location: HPCU Room - Ceiling Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
14B	Beige	0	0	0	0	0	0	0	0	TR	0	0	0	100
Description: Joint Compound Location: Mezzanine above HPCU Room Comments:														
Is asbestos present? No. Analyzed: Yes														

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 ID #: N/A
 Client Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: B87809
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
15A	Multi	0	0	0	0	0	0	0	0	30	0	0	0	70
Description: Composite Board Location: Mezzanine Stairs between I-Beam & CMU Wall Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
15B	Multi	0	0	0	0	0	0	0	0	30	0	0	0	70
Description: Composite Board Location: Mezzanine Stairs between I-Beam & CMU Wall Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
16A	Gray	40	0	0	0	0	0	0	0	0	0	0	0	60
Description: Transite Location: Basement Ceiling Comments:														
Is asbestos present? Yes. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
16B		0	0	0	0	0	0	0	0	0	0	0	0	0
Description: Transite Location: Basement Ceiling Comments:														
Analyzed: No														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
17A	Yellow	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Yellow Glue behind Metal Wall Panels Location: HPCU Room Comments:														
Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
17B	Yellow	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: Yellow Glue behind Metal Wall Panels Location: HPCU Room Comments:														
Is asbestos present? No. Analyzed: Yes														

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 PO #: N/A
 Client Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: B87809
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
18A	Multi	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: 12" White/Blue Fleck Floor Tile Location: Mezzanine - Uni-Sex Bathroom Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
18B	Multi	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: 12" White/Blue Fleck Floor Tile Location: Mezzanine - Uni-Sex Bathroom Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
19A	Black	2	0	0	0	0	0	0	0	2	0	0	0	96
Description: Black Mastic assoc. w/Sample #18A Location: Mezzanine - Uni-Sex Bathroom Comments:														
Is asbestos present? Yes.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
19B		0	0	0	0	0	0	0	0	0	0	0	0	0
Description: Black Mastic assoc. w/Sample #18B Location: Mezzanine - Uni-Sex Bathroom Comments:														
													Analyzed: No	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
20A	White	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: 12" White/Tan Fleck Floor Tile Location: Mezzanine Hallway Comments:														
Is asbestos present? No.													Analyzed: Yes	

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
20B	White	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: 12" White/Tan Fleck Floor Tile Location: Mezzanine Hallway Comments:														
Is asbestos present? No.													Analyzed: Yes	

ProScience Analytical Services, Inc.

Client Name: Cardno ATC, Woburn
 Q #: N/A
 Project #: 60.00962.0021
 Client Reference: MBTA - Riverside
 Method: EPA/600/R-93/116

Batch: **B87809**
 Date Sampled: 8/9/2013
 Date Received: 8/16/2013
 Date Analyzed: 8/20/2013
 Date of Report: 8/21/2013

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
21A	Black	5	0	0	0	0	0	0	0	TR	0	0	0	95
Description: Black Mastic assoc. w/Sample #20A Location: Mezzanine Hallway Comments: Is asbestos present? Yes. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
21B		0	0	0	0	0	0	0	0	0	0	0	0	0
Description: Black Mastic assoc. w/Sample #20B Location: Mezzanine Hallway Comments: Analyzed: No														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
22A	Green	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: 12" Green Floor Tile Location: Mezzanine Office above HPCU Room Comments: Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
22B	Green	0	0	0	0	0	0	0	0	0	0	0	0	100
Description: 12" Green Floor Tile Location: Mezzanine Freight Elevator Room Comments: Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
23A	Yellow	0	0	0	0	0	0	0	TR	0	0	0	0	100
Description: Yellow Mastic assoc. w/Sample #22A Location: Mezzanine Office above HPCU Room Comments: Is asbestos present? No. Analyzed: Yes														

Sample ID	Color	Asbestos %						Non-Asbestos %						
		CHR	AMO	CRO	ACT	TRE	ANT	FBG	MNW	CEL	HAR	SYN	OTH	NON
23B	Yellow	0	0	0	0	0	0	0	TR	0	0	0	0	100
Description: Yellow Mastic assoc. w/Sample #22B Location: Mezzanine Freight Elevator Room Comments: Is asbestos present? No. Analyzed: Yes														

Asbestos Codes: CHR = Chrysotile AMO = Amosite CRO = Crocidolite ACT = Actinolite TRE = Tremolite ANT = Anthophyllite
 Non-Asbestos Codes: FBG = Fiberglass MNW = Mineral Wool CEL = Cellulose HAR = Halloysite SYN = Synthetic OTH = Other NON = Non-Fibrous Minerals

Note: To create a unique lab sample ID, use the Batch # and the Sample ID (example: [Batch #] - [Sample ID]).

* All results are in percentage.

Analyst: Robert West

Samantha B. West for

TAT
(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus. days - lab approval required for rush analysis

PASI Batch #

B8780.9

Client: ATC Associates, Inc.

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00762.0021

PO: _____

Project Site: MBTA - Riverside

Contact: Mike Tiernan - (978) 424 5981

Tel. / Fax #: (781) 932-9400 / 6211

Email: michael.tiernan@atcassociates.com

PLM

Chain of Custody
ver 4.2 Updated 8/10/11

Relinquished By: MDP

Date: 8/16/13

Received By: C. Fleg

Date: 8.16.13

of Samples 48

Received: _____

Analyzed: 5

Results: email fax verbal

By: Aug 21

Date: _____

Stop on first positive: Yes No

Special Instructions: _____

Analyst / Date: Robert W. W. 8/20/13

QC by / Date: SBP 8/21/13

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)						
			SSAPE	Color	Homogeneity	Texture	Frable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non Fibrous
	8/9/13	White Crack Filler																								H8	
	O1A	Platform 2-3 <u>fec TEM</u>	0	H	N	R	N																			3	97
	O1B	" "	0	M	N	R	N																			3	97
	O1C	" "	0	M	N	R	N																			3	97
	O2A	Grey Crack Filler																								H8	
	O2A	Platform 2-3 <u>fec TEM</u>	0	G	N	R	N																			3	97
	O2B	" "	0	Y	N	R	N																			3	97
	O2C	" "	0	G	N	R	N																			3	97

Comments: Birefringence L= less than .010, M= .011-.029, H= greater than .03; Microscope Olympus BH-2, Serial # circle 1- 242277, 229027, 235000, 230663 Lab uses the EPA or ELAP point count method as appropriate, SSAPE = Stereo Scope Asb. % Est.

Lab Sample _____ To form a lab sample id use Batch # - Sample ID.

ProScience Analytical Services, Inc. www.proscience.net

22 Cummings Park, Woburn, MA 01801 T: 781-935-3212 F: 781-932-4857 general@proscience.net

TAT

(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus, days - lab approval required for rush analysis

PASI Batch #

B8780.9

Client: ATC Associates, Inc.

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00962.0021

PO: _____

Project Site: MBTA - Riverside

Contact: Mike Tiernan - (978) 424 5981

Tel. / Fax #: (781) 932-9400 / 6211

Email: michael.tiernan@atcassociates.com

PLM

Chain of Custody

ver 4.2 Updated 8/10/11

Relinquished By: [Signature]

Date: 8/15/13

Received By: _____

Date: _____

of Samples _____

Received: _____

Analyzed: _____

Results: email fax verbal

By: _____

Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: Robert C. White 8/15/13

QC by / Date: _____

Email: michael.hernan@atcassociates.com

Analyst / Date: Robert C. Winters 8/20/13

QC by / Date: _____

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)						
			SSAPE	Color	Homogeneity	Texture	Frable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non Fibrous
	8/9/13	Black Crack Sealant - painted yellow	0	M	C	N	R	N																		43	
	03A	Top of Platform 6-7	0	M	C	N	R	N																		3	97
	03B	"	0	M	C	N	R	N																		43	
	04A	Stanchion Sealant	0	F	Y	N	R	N														W					
		Base of Column Pit/Rail 9	0	Y	N	R	N															TR					100
	04B	"	0	Y	N	R	N															W					
		Base of Column Pit/Rail 9	0	Y	N	R	N															TR					100
	05A	Stair Runner Caulking	0	G	T	N	R	N																			100
		Mezzanine Stairs	0	T	N	R	N																				
	05B	"	0	Y	N	R	N																				100
		Meze. Stairs	0	Y	N	R	N																				

Comments: Birefringence L= less than .010, M=.011-.029, H= greater than .03; Microscope Olympus BH-2, Serial # circle 1-242277, 229027, 235000, 230693 Lab uses the EPA or ELAP point count method as appropriate. SSAPE = Stereo Scope Asb. % Est.

Lab Sample IDs: To form a lab sample id use Batch # - Sample ID.

TAT
(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus. days - lab approval required for rush analysis

PASI Batch #

1387809

Client: ATC Associates, Inc.

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00962.0021 PO: _____

Project Site: MBTA - Riverside

Contact: Mike Tiernan - (978) 424 5981

Tel / Fax #: (781) 932-9400 / 6211

Email: michael.tiernan@atcassociates.com

PLM
Chain of Custody
ver 4.2 Updated 8/10/11

Relinquished By: [Signature] Date: 8/15/13

Received By: _____ Date: _____

of Samples _____ Received: _____ Analyzed: _____

Results: email fax verbal By: _____ Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: [Signature] 8/15/13 QC by / Date: _____

Email: Michael.hernan@atcassociates.com

Analyst/ Date: ~~Robert Chavez~~ 8/20/13

Lab Date: 8/20/13

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)					
			SSAPE	Color	Homogeneity	Texture	Frable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other
	8/9/13	Interior Door Caulk (Grey)																								
	06A	Basement - Green Exit Door	0	Y	N	R	N																			100
	06B	Basement - Battery Room	0	Y	N	K	N																			100
	07A	Grey Duct Sealant	0	Y	N	R	N																			100
	07B	Mezzanine - above HPCU Room	0	Y	N	R	N																			100
	08A	Brown Core Base Mastic ISOLF	0	B	R	N	R	N																		100
	08B	Mezzanine Hallway	0	B	R	N	R	N																		100

Comments: _____
Lab Sample ID: _____
Lab uses the EPA or ELAP point count method as appropriate. SSAPE = Stereo Scope Asb. % Est.

TAT
(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus. days - lab approval required for rush analysis

PASI Batch #

687809

Client: **ATC Associates, Inc.**

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: **60.00962.0021** PO: _____

Project Site: **MBTA - Riverside**

Contact: **Mike Tiernan - (978) 424 5981**

Tel. / Fax #: **(781) 932-9400 / 6211**

Email: **michael.tiernan@atcassociates.com**

PLM

Chain of Custody
ver 4.2 Updated 8/10/11

Relinquished By: MPT

Date: **8/15/13**

Received By: _____

Date: _____

of Samples _____

Received: _____

Analyzed: _____

Results: email fax verbal

By: _____

Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: Robert C. Weston 8/20/13 QC by / Date: _____

Email: michael.tierran@arcassociates.com

Analyst / Date: Robert C. W... 8/20/13 QC By / Date:

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)					Non Asbestos Percentage (%)							
			SSAPE	Color	Homogeneity	Texture	Friable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Circle Type				Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other		
																Amosite	Crocidolite	Tremolite	Anthophyllite							Actinolite	
	8/9/13	2x2 Ceiling Tile																									
	09A	Mezzanine Hallway	0	T	N	F	Y														I	W					10
		"																			I	W					10
	09B	Mezz. Hallway	0	T	N	F	Y														I	W					10
		"																			I	W					10
	10A	2x2 "Rough" Ceiling Tile	0	G	N	P	Y														I						60
		Mezzanine Freight Elevator Rm.																			I						60
	10B	Mezz. Freight Elev. Rm.	0	G	N	P	Y														I						60
		"																			I						60
	11A	2x4 Ceiling Tile	0	B	R	N	F	Y													I	W					10
		Bathroom																			I	W					10
	11B	Bathroom	0	B	R	N	F	Y													I	W					10
		"																			I	W					10

Comments: Birefringence L= less than .010, M=.011-.028, H= greater than .03; Microscope Olympus BH-2, Serial # circle 1-242277, 229027, 235000, 230863 Lab uses the EPA or ELAP point count method as appropriate. SSAPE = Stereo Scope Asb. % Est.

Lab Sample IDs: To form a lab sample id use Batch # - Sample ID.

ProScience Analytical Services, Inc. www.proscience.net

22 Cummings Park, Woburn, MA 01801 T: 781-935-3212 F: 781-932-4857 general@proscience.net

TAT

(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus. days - lab approval required for rush analysis

PASI Batch #

68780.9

Client: ATC Associates, Inc.

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00962.0021 PO: _____

Project Site: MBTA - Riverside

Contact: Mike Tiernan - (978) 424 5981

Tel. / Fax #: (781) 932-9400 / 6211

Email: michael.tiernan@atcassociates.com

PLM

Chain of Custody

ver 4.2 Updated 8/10/11

Relinquished By: [Signature] Date: 8/18/13

Received By: _____ Date: _____

of Samples _____ Received: _____ Analyzed: _____

Results: email fax verbal By: _____ Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: Robert West 8/20/13 QC by / Date: _____

Email: Michael.Tierney@arcassociates.com

Analyst / Date: Robert C. Weaver 8/11/13

QC by / Date: [blank]

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)						
			SSAPE	Color	Homogeneity	Texture	Fracture	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non Asbestos
	8/9/13	2x4 Ceiling Tile																									
	12A	Mezzanine Locker Rm.	O	T	N	F	Y													I	U					10	
	12B	" "	O	T	N	F	Y													I	W					10	
		Mezz Locker Rm.																		30	60						
	13A	Sheetrock	O	G	N	P	Y														W					95	
		HPCU Room - ceiling																									
	13B	" "	O	G	N	P	Y														W					95	
		HPCU Room - Ceiling																									
	14A	Joint Compound	O	B	N	P	Y														W					100	
		HPCU Room - Ceiling																			TR						
	14B	" "	O	B	N	P	Y														W					100	
		Mezzanine above HPCU room																			TR						

Comments: _____ Refractive L= less than .010, M= .011-.029, H= greater than .03; Microscope Olympus BH-2, Serial # circle 1-242277-228027, 235000, 230663 Lab uses the EPA or ELAP point count method as appropriate. SSAPE = Stereo Scope Asb. % Est.

Lab Sample _____ To form a lab sample id use Batch # - Sample ID.

TAT
(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus. days - lab approval required for rush analysis

PASI Batch #

B87809

Client: ATC Associates, Inc.

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00962.0021 PO: _____

Project Site: MBTA - Riverside

Contact: Mike Ternan - (978) 424 5981

Tel. / Fax #: (781) 932-9400 / 6211

Email: michael.ternan@atcassociates.com

PLM

Chain of Custody
ver 4.2 Updated 8/10/11

Relinquished By: [Signature] Date: 8/16/13

Received By: _____ Date: _____

of Samples Received: _____ Analyzed: _____

Results: email fax verbal By: _____ Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: Rhonda L. Vetter 8/16/13 QC by / Date: _____

Email: Michael.N hernandez@casassociates.com

Analyst/ Date: ~~John L. Hernandez~~ 8/9/13

ASBESTOS DATA

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)						
			SSAPE	Color	Homogeneity	Texture	Friable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism			Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non Fibrous
	8/9/13	Composite Board - Mezzanine Stairs																									
	15A	between I-Beam + CMU wall	0	M	N	F	Y															W					20
	15B	Composite Board - Mezz. Stairs																									
		between I-Beam + CMU wall	0	M	N	F	Y															N					70
	16A	Transit																									
		Basement Ceiling	40	Y	N	G	Y			W		⊥	L	N	155	154	40										60
	16B	" "																									
		Basement Ceiling																									
		DNA																									
	17A	Yellow Glue behind Metal Wall Panels																									
		HPCU Room	0	Y	N	H	N																				100
	17B	" "																									
		HPCU Room	0	Y	N	H	N																				100

Comments: Birefringence L= less than .010, M= .011-.029, H= greater than .03; Microscope Olympus BH-2, Serial # circle 1- 242277, 228027, 235000, 230663 Lab uses the EPA or ELAP point count method as appropriate. SSAPE = Stereo Scope Asb. % Est.

Lab Sample IDs: To form a lab sample id use Batch # - Sample ID.

TAT
(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus. days - lab approval required for rush analysis

PASI Batch #

B87809

Client: ATC Associates, Inc.

Address: 600 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00962.0021 PO: _____

Project Site: MBTA - Riverside

Contact: Mike Ternan - (978) 424 5981

Tel / Fax #: (781) 932-9400 / 6211

Email: michael.ternan@atcassociates.com

PLM

Chain of Custody
ver 4.2 Updated 8/10/11

Relinquished By: [Signature] Date: 8/6/13

Received By: _____ Date: _____

of Samples _____ Received: _____ Analyzed: _____

Results: email fax verbal By: _____ Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: [Signature] 8/20/13 QC by / Date: _____

Sample ID	Date Sampled	Description / Location	Stereo Scope			Optical Properties							RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)						
			SSAPE	Color	Homogeneity	Texture	Friable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non Fibrous
	8/9/13	12" White/Blue fleck floor tile																									
	18A	Mezzanine - Uni-Sex Bathroom 20SF	0	M	N	H	N																				100
	18B	"	0	M	N	H	N																				100
	19A	Black Mastic on 18A	0	B	K	N	R	N		W		+	L	N	133	154	2						4				
	19B	Mezzanine - Uni-Sex Bathroom																					2				96
	19B	Black Mastic on 18B																									
		Mezz - Uni-Sex Bathroom DNA																									
	20A	12" White/Tan fleck floor tile	0	W	N	H	N																				100
		Mezzanine Hallway 300SF																									
	20B	"	0	L	H	N	N																				100
		Mezz. Hall 50-6																									

ProScience Analytical Services, Inc. www.proscience.net

22 Cummings Park, Woburn, MA 01801 T: 781-932-3212 F: 781-932-4857 general@proscience.net

TAT

(circle one)

3 Hours 6 Hours Same Day Next Day

2 Days 3 Days 4-5 Days Other _____

TAT in bus, days - lab approval required for rush analysis

PASI Batch #

687809

Client: ATC Associates, Inc.

Address: 900 West Cummings Park, Suite 5500 - Woburn, MA

Project #: 60.00962.0021 PO: _____

Project Site: MBTA - Riverside

Contact: Mike Tiernan - (978) 424 5981

Tel. / Fax #: (781) 932-9400 / 6211

Email: michael.tiernan@atcassociates.com

PLM

Chain of Custody

ver 4.2 Updated 8/10/11

Relinquished By: [Signature] Date: 8/15/13

Received By: _____ Date: _____

of Samples Received: _____ Analyzed: _____

Results: email fax verbal By: _____ Date: _____

Stop on first positive: Yes / No

Special Instructions: _____

Analyst / Date: Michael Tiernan 8/15/13 QC by / Date: _____

Sample ID	Date Sampled	Description / Location	Stereo Scope					Optical Properties					RI		Asbestos Percentage (%)						Non Asbestos Percentage (%)						
			SSAPE	Color	Homogeneity	Texture	Frable	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism		⊥	Chrysotile	Amosite	Crocidolite	Tremolite	Anthophyllite	Actinolite	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non Fibrous
	8/9/13	Black Mastie on 20A																									
	21A	Mezzanine Hallway	0	B	K	N	R	N																			95
	21B	Black Mastie on 20B																									
	21B	Mezz. Hall																									
	22A	12" Green Floor Tile Mezz. Office above HPCU Room	0	G	N	N	H	N																			100
	22B	" Mezzanine Freight Elevator Room	0	L	N	N	H	N																			100
	23A	Yellow Mastie on 22A Mezz. Office above HPCU Room	0	Y	N	R	N																				100
	23B	Yellow Mastie on 22B Mezz Freight Elevator Rm.	0	Y	N	R	N																				100

Comments: Birefringence L= less than .010, M= .011-.029, H= greater than .03; Microscope Olympus BH-2, Serial # circle 1-242277, 229027, 235000, 230663 Lab uses the EPA or ELAP point count method as appropriate. SSAPE = Stereo Scope Asb. % Est.

Lab Sample IDs: To form a lab sample id use Batch # - Sample ID.

APPENDIX B

INVENTORY AND COST ESTIMATE TABLE FOR OTHER HAZARDOUS MATERIALS

Table 1
Hazardous Building Materials Inventory Table
Riverside Carhouse
335 Grove Street
Newton, Massachusetts

Area	Hazardous Materials						Miscellaneous Items* (See Table 2)
	4-foot long (or less) fluorescent bulbs	8-foot long fluorescent bulbs	Fluorescent/HID light fixture ballasts (labeled as "No PCBs")	Fluorescent/HID light fixture ballasts (unlabeled)	Motors/ Pumps (lubricating oil)		
Platform Type A (Rails 8-9)	28	-	14	-	-	-	-
Platform Type B (Rails 2-3)	-	-	-	-	-	-	-
Bathrooms	12	-	7	-	-	-	-
HPCU Room	28	12	14	6	5	-	-
Mezzanine (above HPCU Room)	16	-	8	-	1	-	-
Mezzanine	-	-	-	-	-	-	-
Basement corridor	-	18	-	9	-	-	-
Basement boiler room - mezzanine	-	4	2	-	3	-	*
Estimated Total Units	84	30	43	15	6	-	*
Estimated Disposal Cost per Unit	\$1	\$2	\$5	\$5	\$50	-	*
Estimated Total Cost	\$84	\$60	\$215	\$75	\$300	\$2,050	
						Estimated Subtotal	\$2,784
						15% Contingency	\$418
						Estimated Total Cost	\$3,200

Notes:

Estimated Total Cost rounded to nearest \$100 interval.

* Miscellaneous Items listed in Table 2

Table 2
Miscellaneous Items Inventory Table
3rd, 4th and 5th Floors
501 Boylston Street
Boston, Massachusetts

Area	Item Description	Total Units	Est. Disposal Cost (Unit)	Total Item Cost
Basement Boiler Room - Mezzanine	Emergency generator w/ ~250 gallon diesel fuel AST	1	\$2,000	\$2,000
	Emergency generator lead acid battery	1	\$50	\$50
Total Cost (Misc. Items)				\$2,050

Notes:

HPCU = Hydraulic Pressure Control Unit

APPENDIX B

HAZARDOUS MATERIALS SURVEYS:

RIVERSIDE CARHOUSE – PCBs

By Cardno ATC

September 11, 2013

Mr. Daniel Bass, RA LEED AP
Senior Associate
Baker/Wohl Architects
132 Lincoln Street
Boston, Massachusetts 02111

Via email: dbass@baker-wohl.com

Cardno ATC

600 West Cummings Park
Suite 5450
Woburn, MA 01801

Phone +1 781 932 9400
Fax +1 781 932 6211
www.cardno.com

www.cardnoatc.com

**Subject: Limited PCB Sealant Survey
MBTA Riverside Carhouse
Newton, Massachusetts
Cardno ATC Project No. 060.00962.0021**

Dear Mr. Bass:

Cardno ATC has been retained by Baker/Wohl Architects to perform a limited survey of polychlorinated biphenyls (PCBs) in suspect sealant materials at the MBTA Riverside Carhouse located 335 Grove Street, Newton, Massachusetts (the "Site"). The Site is currently developed with one (1) one-story maintenance building that constructed of various masonry with steel framing built in 1976. The survey was conducted in association with the proposed renovation of the Site building. The survey was performed on August 9, 2013, by Mr. Sam Sanders, Cardno ATC Field Geologist.

The survey objective was to evaluate for the presence of PCB-containing sealants (i.e. various caulking and glazing compound materials) that would require special management as part of the proposed renovation shown on the Platforms for Riverside, Reservoir, Lake Street, and Mattapan Carhouses, Contract No. Z92PS54 Plans (Baker/Wohl), July 1, 2013). This survey only evaluated sealants that were observed on the date of the survey. The survey did not include testing of other surrounding building materials (i.e. masonry surrounds, frames, sills, etc.) adjacent to the sealants.

Following is a summary of the survey field activities, analytical data, and conclusions.

Field Activities

Cardno ATC collected bulk samples of a total of three (3) suspect sealant materials observed in the renovation zone identified by Baker/Wohl.

Samples were collected via hand tools (i.e. screwdriver, hammer, pliers, chisel, etc.) and the hand tools were decontaminated with hexane between samples. The samples were then placed in properly labeled, laboratory-supplied clean glass jars and transported under a chain-of-custody to Con-Test Analytical Laboratory, Inc. (Con-Test) of East Longmeadow, Massachusetts, for PCB analysis. Samples were analyzed following United States Environmental Protection Agency (USEPA) Method 3540C for Soxhlet extraction and Method 8082 for PCB analysis.

Laboratory Analysis Results

The following table summarizes the samples submitted for laboratory analysis and associated results:

Table 1: PCB Survey Summary – Riverside Carhouse						
Sample ID	Sample Material	Sample Location	Materials Between	Total PCB Concentration	Estimated Quantity*(LF)	ACM
01A-Caulk-Platform 2-3	Expansion joint caulk	Interior platform end between rails 2 and 3	Concrete	6.18	20	No
01B-Caulk-Platform 6-7	Expansion joint caulk	Interior platform end between rails 6 and 7	Concrete	9.54	20	No
01C-Caulk-Platform 8-9	Expansion joint caulk	Interior platform end between rails 8 and 9	Concrete	6.8	20	No
02A-Caulk-Platform 2-3	Expansion joint caulk	Interior platform end between rails 2 and 3	Concrete	4.1	20	No
02B-Caulk-Platform 8-9	Expansion joint caulk	Interior platform end between rails 8 and 9	Concrete	12.1	20	No
4-Caulk-Platform 6-7	Expansion joint caulk	Interior platform end between rails 6 and 7	Concrete	10.75	20	No
8-Caulk-Bathroom	Door frame caulk	Interior bathroom	CMU, Metal	ND (0.73)	1	NA (Not Suspect ACM)

PCB concentrations shown in parts per million (ppm)

ND = Not detected above the indicated laboratory detection limit

NA = Not Applicable

Bold = PCBs detected in sample

LF = Linear feet

*Estimated quantities only provided for material which were determined to contain PCBs

ACM = Asbestos Containing Material

PCBs were detected in six (6) of the seven (7) materials sampled at a concentration between 4.1 and 12.1 parts per million (ppm). Aroclor 1016 and Aroclor 1254 was the only Aroclors observed in the samples. As reported in the laboratory analytical report case narrative summary, all reported results were within laboratory quality control objectives with the exception of the sample where PCBs were detected (Sample 01C-Caulk-Platform 8-9). The sample fingerprint does not match standard exactly. Therefore, the sample was quantitated against the closest matching standard. Cardno ATC does not believe this affects the data quality for this sample because there are other samples of similar materials with similar results. The laboratory analytical data is further presented in Table 2 and the associated laboratory analytical report is attached.

Conclusions and Recommendations

The management of PCB-containing materials is regulated by the Toxic Substances Control Act (TSCA) and associated 40 CFR 761 Regulations, as administered by the United States Environmental Protection Agency (EPA).

The six PCB-containing sealants observed at the Site contained low concentration of PCBs (between 4.1 and 12.1 ppm). Cardno ATC believes these sealants, which were very limited in extent, would be classified under TSCA as

an Excluded PCB Product, which are defined as materials with concentrations between 1 ppm and 50 ppm and which meet the following additional conditions:

- The products or source of the products containing less than 50 ppm concentration PCBs were legally manufactured, processed, distributed in commerce, or used before October 1, 1984;
- The products or source of the products containing less than 50 ppm concentrations PCBs were legally manufactured, processed, distributed in commerce, or used, i.e., pursuant to authority granted by EPA regulation, by exemption petition, by settlement agreement, or pursuant to other Agency-approved programs; and
- The resulting PCB concentration (i.e. below 50 ppm) is not a result of dilution, or leaks and spills of PCBs in concentrations greater than 50 ppm.

Excluded PCB Products may be managed by any permitted waste management or recycling facility as long as the facility is made aware of the fact that material being sent to them contains PCBs and their permit allows them to accept these types of materials. Many solid waste and recycling facilities cannot accept materials that contain PCBs at 2 ppm or greater. Workers handling Excluded PCB Products must also be made aware that these materials are present.

Materials which were determined to not contain PCBs are not regulated by the Toxic Substances Control Act (TSCA) or state regulations and, if confirmed not to contain asbestos, may be managed as demolition debris.

Cardno ATC recommends incorporating Excluded PCB Product handling and disposal requirements into project Technical Specifications.

Limitations

Our professional services have been performed and our findings obtained and prepared in accordance with customary principles and practices in the field of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated. Environmental evaluations are limited in the sense that conclusions are developed and information obtained from limited research and secondary sources. Except as set forth in this report, Cardno ATC has not made independent investigations as to the accuracy or completeness of the information derived from the secondary sources and personal interviews and has presumed that such information was accurate and complete. This report is intended for the sole use of Baker-Wohl. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings or conclusions is at risk of said user.

Sincerely,



Sam Sanders
Field Geologist
for Cardno ATC
Direct Line +1 781-404-1352
Email: sam.sanders@cardno.com



Michael Gitten, LSP, PE
Division Manager
for Cardno ATC
Direct Line +1 781-404-1439
Email: michael.gitten@cardno.com

Attachments: Table 1 – PCB Analytical Data Summary
PCB Analytical Laboratory Report

cc: Michael Gitten, Cardno ATC
Doug Rader, Cardno ATC

File: Limited PCB Sampling Report-Riverside_9.11.13_Final

Table 1
PCB Sample Information and Analytical Results: Sealants
Platform Upgrade and Bathroom Replacement Project
MBTA Riverside Carhouse
Newton, Massachusetts

Sample ID	01A-Caulk-Platform 2-3	01B-Caulk-Platform 6-7	01C-Caulk-Platform 8-9	02A-Caulk-Platform 2-3	02B-Caulk-Platform 8-9	4-Caulk-Platform 6-7**	8-Caulk-Bathroom
Date Collected	8/9/2013	8/9/2013	8/9/2013	8/9/2013	8/9/2013	8/9/2013	8/9/2013
Interior/Exterior	Interior						
Material Type	Caulk						
Location	Caulk between concrete platform expansion joint	Caulk between concrete platform expansion joint	Caulk between concrete platform expansion joint	Caulk between concrete platform expansion joint	Caulk between concrete platform expansion joint	Caulk between concrete platform expansion joint	Edge of door frame caulk, left middle portion of frame
Material(s) Between	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	CMU, Metal
Color	White	Gray	Gray	White	Gray	Gray	Gray
Characteristics	Smooth, Soft, Not Sticky, Rubbery	Smooth, Soft, Not Sticky, Rubbery	Smooth, Soft, Not Sticky, Rubbery	Smooth, Soft, Not Sticky, Rubbery	Smooth, Soft, Not Sticky, Rubbery	Smooth, Soft, Not Sticky, Rubbery	Smooth, Soft, Not Sticky, Rubbery
Asbestos Containing Material (ACM) - Yes/No/Not Known?	No	No	No	No	No	No	NA
PCB Aroclors	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)	Concentration mg/kg (ppm)
Aroclor-1016	5.4	8.6	5.7	2.5	7.3	9.8	<0.73
Aroclor-1221	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
Aroclor-1232	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
Aroclor-1242	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
Aroclor-1248	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
Aroclor-1254	0.78	0.94	1.1	1.6	4.8	0.95	<0.73
Aroclor-1260	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
Aroclor-1262	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
Aroclor-1268	<0.70	<0.77	<0.72	<0.68	<0.74	<0.74	<0.73
TOTAL PCBs	6.18	9.54	6.8	4.1	12.1	10.75	ND
QA - Laboratory Surrogate Compounds	% Recovery (Limits)	% Recovery (Limits)	% Recovery (Limits)	% Recovery (Limits)	% Recovery (Limits)	% Recovery (Limits)	% Recovery (Limits)
DCBP	72.5	88.6	*	90.9	90.3	91.1	39.1
DCBP	83.8	83.7	*	66.6	85.1	79.4	47.8
TCMX	92	89.5	*	77.6	73.9	75.8	49
TCMX	95	79.8	*	70.2	68.8	69.0	50

Notes:

mg/kg (ppm) = milligram per kilogram (parts per million)

ND = Non-Detect above noted detection limit.

NA = Not Applicable (Not Suspect ACM)

*Surrogate recovery not available

BOLD = PCBs Detected

**Similar to samples 02A-Caulk-Platform 2-3 and 02B-Caulk-Platform 8-9.

QA/QC Notes:

* - The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

- Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.

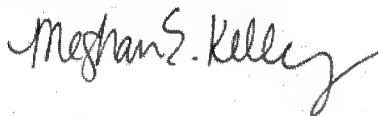
August 26, 2013

Dan White
Cardno ATC Associates - Woburn
600 W Cummings Park, Suite 5500
Woburn, MA 01801

Project Location: MBTA Carhouse - Riverside
Client Job Number:
Project Number: 060.00962.0021
Laboratory Work Order Number: 13H0706

Enclosed are results of analyses for samples received by the laboratory on August 19, 2013. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Meghan E. Kelley
Project Manager

Cardno ATC Associates - Woburn
600 W Cummings Park, Suite 5500
Woburn, MA 01801
ATTN: Dan White

REPORT DATE: 8/26/2013

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 060.00962.0021

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 13H0706

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: MBTA Carhouse - Riverside

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
01A	13H0706-01	Caulk	Caulk-Platform 2-3	SW-846 8082A	
02A	13H0706-02	Caulk	Caulk-Platform 2-3	SW-846 8082A	
01B	13H0706-03	Caulk	Caulk-Platform 6-7	SW-846 8082A	
4	13H0706-04	Caulk	Caulk-Platform 6-7	SW-846 8082A	
02B	13H0706-05	Caulk	Caulk-Platform 8-9	SW-846 8082A	
01C	13H0706-06	Caulk	Caulk-Platform 8-9	SW-846 8082A	
8	13H0706-07	Caulk	Caulk-Bathroom	SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A**Qualifications:**

Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.

Analyte & Samples(s) Qualified:**Aroclor-1016, Aroclor-1016 [2C]**

13H0706-01[01A], 13H0706-02[02A], 13H0706-03[01B], 13H0706-04[4], 13H0706-05[02B], 13H0706-06[01C]

Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.

Analyte & Samples(s) Qualified:**Aroclor-1016**

13H0706-02[02A]

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Michael A. Erickson
Laboratory Director

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Platform 2-3

Work Order: 13H0706

Date Received: 8/19/2013

Field Sample #: 01A

Sampled: 8/9/2013 08:45

Sample ID: 13H0706-01

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	5.4	0.70	mg/Kg	4	O-04	SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1221 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1232 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1242 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1248 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1254 [2]	0.78	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1260 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1262 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC
Aroclor-1268 [1]	ND	0.70	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:16	MJC

Surrogates	% Recovery	Recovery Limits	Flag
Decachlorobiphenyl [1]	77.6	30-150	8/23/13 22:16
Decachlorobiphenyl [2]	85.4	30-150	8/23/13 22:16
Tetrachloro-m-xylene [1]	92.9	30-150	8/23/13 22:16
Tetrachloro-m-xylene [2]	100	30-150	8/23/13 22:16

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Platform 2-3

Work Order: 13H0706

Received: 8/19/2013

Field Sample #: 02A

Sampled: 8/9/2013 08:55

Sample ID: 13H0706-02

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	2.5	0.68	mg/Kg	4	O-04, P-02	SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1221 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1232 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1242 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1248 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1254 [2]	1.6	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1260 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1262 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC
Aroclor-1268 [1]	ND	0.68	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:30	MJC

Surrogates	% Recovery	Recovery Limits	Flag
Decachlorobiphenyl [1]	85.1	30-150	8/23/13 22:30
Decachlorobiphenyl [2]	97.4	30-150	8/23/13 22:30
Tetrachloro-m-xylene [1]	96.5	30-150	8/23/13 22:30
Tetrachloro-m-xylene [2]	105	30-150	8/23/13 22:30

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Platform 6-7

Work Order: 13H0706

Date Received: 8/19/2013

Field Sample #: 01B

Sampled: 8/9/2013 09:15

Sample ID: 13H0706-03

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	8.6	0.77	mg/Kg	4	O-04	SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1221 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1232 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1242 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1248 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1254 [2]	0.94	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1260 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1262 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC
Aroclor-1268 [1]	ND	0.77	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:44	MJC

Surrogates	% Recovery	Recovery Limits	Flag
Decachlorobiphenyl [1]	83.7	30-150	8/23/13 22:44
Decachlorobiphenyl [2]	94.2	30-150	8/23/13 22:44
Tetrachloro-m-xylene [1]	94.8	30-150	8/23/13 22:44
Tetrachloro-m-xylene [2]	104	30-150	8/23/13 22:44

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Platform 6-7

Work Order: 13H0706

Received: 8/19/2013

Field Sample #: 4

Sampled: 8/9/2013 09:20

Sample ID: 13H0706-04

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	9.8	0.74	mg/Kg	4	O-04	SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1221 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1232 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1242 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1248 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1254 [2]	0.95	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1260 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1262 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC
Aroclor-1268 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 22:58	MJC

Surrogates	% Recovery	Recovery Limits	Flag
Decachlorobiphenyl [1]	80.2	30-150	8/23/13 22:58
Decachlorobiphenyl [2]	91.1	30-150	8/23/13 22:58
Tetrachloro-m-xylene [1]	89.2	30-150	8/23/13 22:58
Tetrachloro-m-xylene [2]	98.0	30-150	8/23/13 22:58

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Platform 8-9

Work Order: 13H0706

Date Received: 8/19/2013

Field Sample #: 02B

Sampled: 8/9/2013 10:15

Sample ID: 13H0706-05

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	7.3	0.74	mg/Kg	4	O-04	SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1221 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1232 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1242 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1248 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1254 [1]	4.8	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1260 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1262 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Aroclor-1268 [1]	ND	0.74	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:12	MJC
Surrogates	% Recovery	Recovery Limits	Flag						
Decachlorobiphenyl [1]	71.4	30-150							
Decachlorobiphenyl [2]	84.0	30-150							
Tetrachloro-m-xylene [1]	86.4	30-150							
Tetrachloro-m-xylene [2]	90.6	30-150							

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Platform 8-9

Work Order: 13H0706

Received: 8/19/2013

Field Sample #: 01C

Sampled: 8/9/2013 10:20

Sample ID: 13H0706-06

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	5.7	0.72	mg/Kg	4	O-04	SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1221 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1232 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1242 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1248 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1254 [2]	1.1	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1260 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1262 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC
Aroclor-1268 [1]	ND	0.72	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:26	MJC

Surrogates	% Recovery	Recovery Limits	Flag
Decachlorobiphenyl [1]	74.3	30-150	8/23/13 23:26
Decachlorobiphenyl [2]	94.1	30-150	8/23/13 23:26
Tetrachloro-m-xylene [1]	90.6	30-150	8/23/13 23:26
Tetrachloro-m-xylene [2]	96.4	30-150	8/23/13 23:26

Project Location: MBTA Carhouse - Riverside

Sample Description: Caulk-Bathroom

Work Order: 13H0706

Date Received: 8/19/2013

Field Sample #: 8

Sampled: 8/9/2013 11:30

Sample ID: 13H0706-07

Sample Matrix: Caulk

Polychlorinated Biphenyls with 3540 Soxhlet Extraction

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1221 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1232 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1242 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1248 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1254 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1260 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1262 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Aroclor-1268 [1]	ND	0.73	mg/Kg	4		SW-846 8082A	8/20/13	8/23/13 23:40	MJC
Surrogates	% Recovery	Recovery Limits	Flag						
Decachlorobiphenyl [1]	76.7	30-150							
Decachlorobiphenyl [2]	86.7	30-150							
Tetrachloro-m-xylene [1]	97.5	30-150							
Tetrachloro-m-xylene [2]	107	30-150							

Sample Extraction Data

Prep Method: SW-846 3540C-SW-846 8082A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
13H0706-01 [01A]	B079182	0.572	10.0	08/20/13
13H0706-02 [02A]	B079182	0.585	10.0	08/20/13
13H0706-03 [01B]	B079182	0.520	10.0	08/20/13
13H0706-04 [4]	B079182	0.537	10.0	08/20/13
13H0706-05 [02B]	B079182	0.541	10.0	08/20/13
13H0706-06 [01C]	B079182	0.557	10.0	08/20/13
13H0706-07 [8]	B079182	0.549	10.0	08/20/13

QUALITY CONTROL

Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B079182 - SW-846 3540C

Blank (B079182-BLK1)

Prepared: 08/20/13 Analyzed: 08/23/13

Aroclor-1016	ND	0.80	mg/Kg							
Aroclor-1016 [2C]	ND	0.80	mg/Kg							
Aroclor-1221	ND	0.80	mg/Kg							
Aroclor-1221 [2C]	ND	0.80	mg/Kg							
Aroclor-1232	ND	0.80	mg/Kg							
Aroclor-1232 [2C]	ND	0.80	mg/Kg							
Aroclor-1242	ND	0.80	mg/Kg							
Aroclor-1242 [2C]	ND	0.80	mg/Kg							
Aroclor-1248	ND	0.80	mg/Kg							
Aroclor-1248 [2C]	ND	0.80	mg/Kg							
Aroclor-1254	ND	0.80	mg/Kg							
Aroclor-1254 [2C]	ND	0.80	mg/Kg							
Aroclor-1260	ND	0.80	mg/Kg							
Aroclor-1260 [2C]	ND	0.80	mg/Kg							
Aroclor-1262	ND	0.80	mg/Kg							
Aroclor-1262 [2C]	ND	0.80	mg/Kg							
Aroclor-1268	ND	0.80	mg/Kg							
Aroclor-1268 [2C]	ND	0.80	mg/Kg							
Surrogate: Decachlorobiphenyl	3.55		mg/Kg	4.00		88.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	3.70		mg/Kg	4.00		92.5	30-150			
Surrogate: Tetrachloro-m-xylene	2.67		mg/Kg	4.00		66.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	3.11		mg/Kg	4.00		77.8	30-150			

LCS (B079182-BS1)

Prepared: 08/20/13 Analyzed: 08/23/13

Aroclor-1016	2.7	0.80	mg/Kg	4.00		67.4	40-140			
Aroclor-1016 [2C]	2.8	0.80	mg/Kg	4.00		69.9	40-140			
Aroclor-1260	3.1	0.80	mg/Kg	4.00		77.9	40-140			
Aroclor-1260 [2C]	3.3	0.80	mg/Kg	4.00		81.6	40-140			
Surrogate: Decachlorobiphenyl	3.53		mg/Kg	4.00		88.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	3.74		mg/Kg	4.00		93.4	30-150			
Surrogate: Tetrachloro-m-xylene	2.53		mg/Kg	4.00		63.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	2.94		mg/Kg	4.00		73.5	30-150			

LCS Dup (B079182-BSD1)

Prepared: 08/20/13 Analyzed: 08/23/13

Aroclor-1016	2.7	0.80	mg/Kg	4.00		68.7	40-140	1.90	30	
Aroclor-1016 [2C]	2.9	0.80	mg/Kg	4.00		72.8	40-140	4.07	30	
Aroclor-1260	3.1	0.80	mg/Kg	4.00		76.4	40-140	1.92	30	
Aroclor-1260 [2C]	3.3	0.80	mg/Kg	4.00		81.4	40-140	0.290	30	
Surrogate: Decachlorobiphenyl	3.39		mg/Kg	4.00		84.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	3.59		mg/Kg	4.00		89.9	30-150			
Surrogate: Tetrachloro-m-xylene	2.61		mg/Kg	4.00		65.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	3.03		mg/Kg	4.00		75.7	30-150			

FLAG/QUALIFIER SUMMARY

- * QC result is outside of established limits.
 - † Wide recovery limits established for difficult compound.
 - ‡ Wide RPD limits established for difficult compound.
 - # Data exceeded client recommended or regulatory level
- Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
- No results have been blank subtracted unless specified in the case narrative section.
- O-04 Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
- P-02 Sample RPD between primary and confirmatory analysis exceeded 40%. Per EPA method 8000, the lower value was reported due to obvious chromatographic interference on the column with the higher result.

CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
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No certified Analyses included in this Report

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2014
MA	Massachusetts DEP	M-MA100	06/30/2014
CT	Connecticut Department of Public Health	PH-0567	09/30/2013
NY	New York State Department of Health	10899 NELAP	04/1/2014
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2014
RI	Rhode Island Department of Health	LAO00112	12/30/2013
NC	North Carolina Div. of Water Quality	652	12/31/2013
NJ	New Jersey DEP	MA007 NELAP	06/30/2014
FL	Florida Department of Health	E871027 NELAP	06/30/2014
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2014
WA	State of Washington Department of Ecology	C2065	02/23/2014
ME	State of Maine	2011028	06/9/2015
VA	Commonwealth of Virginia	460217	12/14/2013
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2012

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F: 413-525-6405
www.contestlabs.com



Sample Receipt Checklist

CLIENT NAME: Cardno ATC RECEIVED BY: CEC DATE: 8/19/13

- 1) Was the chain(s) of custody relinquished and signed? Yes No No CoC Included
2) Does the chain agree with the samples? Yes No
If not, explain:
3) Are all the samples in good condition? Yes No
If not, explain:

4) How were the samples received:

On Ice ☒ Direct from Sampling ☐ Ambient ☐ In Cooler(s) ☒

Were the samples received in Temperature Compliance of (2-6°C)? Yes No N/A

Temperature °C by Temp blank _____ Temperature °C by Temp gun 4.6°

5) Are there Dissolved samples for the lab to filter? Yes No

Who was notified _____ Date _____ Time _____

6) Are there any RUSH or SHORT HOLDING TIME samples? Yes No

Who was notified _____ Date _____ Time _____

7) Location where samples are stored: 14

Permission to subcontract samples? Yes No
(Walk-in clients only) if not already approved
Client Signature: _____

8) Do all samples have the proper Acid pH: Yes No N/A

9) Do all samples have the proper Base pH: Yes No N/A

10) Was the PC notified of any discrepancies with the CoC vs the samples: Yes No N/A

Containers received at Con-Test

		# of containers			# of containers
1 Liter Amber			8 oz amber/clear jar		
500 mL Amber			4 oz amber/clear jar		
250 mL Amber (8oz amber)			2 oz amber/clear jar		7
1 Liter Plastic			Air Cassette		
500 mL Plastic			Hg/Hopcalite Tube		
250 mL plastic			Plastic Bag / Ziploc		
40 mL Vial - type listed below			PM 2.5 / PM 10		
Colisure / bacteria bottle			PUF Cartridge		
Dissolved Oxygen bottle			SOC Kit		
Encore			TO-17 Tubes		
Flashpoint bottle			Non-ConTest Container		
Perchlorate Kit			Other glass jar		
Other			Other		

Laboratory Comments:

40 mL vials: # HCl _____ # Methanol _____

Doc# 277 # Bisulfate _____ # DI Water _____

Rev. 3 May 2012 # Thiosulfate _____ Unpreserved _____

Time and Date Frozen:

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: Con-Test Analytical Laboratory

Project #: 13H0706

Project Location: MBTA Carhouse - Riverside

RTN:

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

13H0706-01 thru 13H0706-07

Matrices: Caulk

CAM Protocol (check all that below)

8260 VOC CAM II A ()	7470/7471 Hg CAM IIIB ()	MassDEP VPH CAM IV A ()	8081 Pesticides CAM V B ()	7196 Hex Cr CAM VI B ()	MassDEP APH CAM IX A ()
8270 SVOC CAM II B ()	7010 Metals CAM III C ()	MassDEP EPH CAM IV A ()	8151 Herbicides CAM V C ()	8330 Explosives CAM VIII A ()	TO-15 VOC CAM IX B ()
6010 Metals CAM III A ()	6020 Metals CAM III D ()	8082 PCB CAM V A (X)	9014 Total Cyanide/PAC CAM VI A ()	6860 Perchlorate CAM VIII B ()	

Affirmative response to Questions A through F is required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
E a	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	<input type="checkbox"/> Yes <input type="checkbox"/> No ¹
E b	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	<input type="checkbox"/> Yes <input type="checkbox"/> No ¹
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all No responses to Questions A through E)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹

A response to questions G, H and I below is required for "Presumptive Certainty" status


G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
----------	-----------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------

Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.

H	Were all QC performance standards specified in the CAM protocol(s) achieved?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No ¹
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹

¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: 

Position: Laboratory Director

Printed Name: Michael A. Erickson

Date: 08/26/13

APPENDIX C

BIDDING ADDENDUM

Numbers 1 through 5

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MBTA CONTRACT NO. R20CN01

WORK PLATFORMS FOR RIVERSIDE CARHOUSE

NEWTON, MASSACHUSETTS

ADDENDUM NO. 1

The attention of bidders submitting bids for the above project is called to the following Addendum to the NOTICE TO BIDDERS and INSTRUCTIONS TO BIDDERS.

The items set forth herein, whether of omission, addition or substitution are to be included in and form a part of the Bid submitted.

THE NUMBER OF THIS ADDENDUM (NO. 1) MUST BE ENTERED IN THE SPACE PROVIDED ON PAGE 00410-3 OF THE FORM FOR BID IN THE BID FORM.

August 7, 2015

By: Frank DePaola
Interim General Manager of the MBTA

ITEM NO. 1

MODIFICATION TO NOTICE TO BIDDERS – BID DATE POSTPONED:

On Page 1 of the NOTICE TO BIDDERS, remove and replace the second paragraph with the following new paragraph:

Electronic bids for MBTA Contract No. R20CN01, WORK PLATFORMS FOR RIVERSIDE CARHOUSE, Newton, Massachusetts (CLASS 1, GENERAL TRANSIT CONSTRUCTION AND PROJECT VALUE - \$2,730,630.00), can be submitted at www.bidx.com until two o'clock (2:00 p.m.) on **August 27, 2015**. Immediately thereafter, in a designated room, the Bids will be opened and read publicly.

ITEM NO. 2

MODIFICATION TO NOTICE TO BIDDERS – PRE-BID CONFERENCE DATE POSTPONED:

On Page 2 of the NOTICE TO BIDDERS, remove and replace the second paragraph with the following new paragraph:

A prebid conference will be held on **August 17, 2015** at 10:00 a.m. at the Design and Construction Directorate, 100 Summer Street, 12th Floor, Boston, MA. Any request for interpretation of the Plans and Specifications should be submitted in writing at the same time.

ITEM NO. 3

MODIFICATION TO INSTRUCTIONS TO BIDDERS – PRE-BID CONFERENCE DATE POSTPONED:

On Page 8 of the INSTRUCTIONS TO BIDDERS, remove and replace Paragraph 1.27 – PREBID CONFERENCE with the following new paragraph:

A Pre-bid Conference will be held at 10 a.m. on **August 17, 2015** at the office of the Project Manager, Roma McKenzie-Campbell, Design and Construction Directorate, 100 Summer Street, 12th Floor, Boston, MA 02110; 617 222-4428. It is imperative that prospective Bidders have a representative attend this meeting. Any request for interpretation of drawings and specifications should be submitted in writing at the same time.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MBTA CONTRACT NO. R20CN01

WORK PLATFORMS FOR RIVERSIDE CARHOUSE

NEWTON, MASSACHUSETTS

ADDENDUM NO. 2

The attention of bidders submitting bids for the above project is called to the following Addendum to the General Conditions, Supplementary Conditions, Construction Specifications and Contract Drawings.

The items set forth herein, whether of omission, addition or substitution are to be included in and form a part of the Bid submitted.

THE NUMBER OF THIS ADDENDUM (NO. 2) MUST BE ENTERED IN THE SPACE PROVIDED ON PAGE 00410-3 OF THE FORM FOR BID IN THE BID FORM.

August 17, 2015

By: Frank DePaola
Interim General Manager of the MBTA

ITEM NO. 1**REPLACE THE TITLE PAGE OF THE CONTRACT SPECIFICATIONS:**

Replace the Title Page of the Contract Specifications with the new Title Page included as page 4 of this Addendum No. 2.

ITEM NO. 2**REPLACE A PAGE OF SECTION 00700 – GENERAL CONDITIONS:**

Replace page 9 of Section 00700 – GENERAL CONDITIONS with the new page 9 included as page 5 of this Addendum No. 2.

ITEM NO. 3**REPLACE PAGES OF SECTION 00800 – SUPPLEMENTARY CONDITIONS:**

Replace pages 28(1) to 28(47) of Section 00800 – SUPPLEMENTARY CONDITIONS with the new pages 28(1) to 28(47) included as pages 6 through 52 of this Addendum No. 2.

ITEM NO. 4**CHANGE TO CONSTRUCTION SPECIFICATIONS TABLE OF CONTENTS:**

Replace page 01000-3 of the CONSTRUCTION SPECIFICATIONS TABLE OF CONTENTS with the new page 01000-3 included as page 53 of this Addendum No. 2. The number of pages for Section 13347 – PREFABRICATED WORK PLATFORMS is changed from 9 to 10.

ITEM NO. 5**SUBSTITUTE SECTION 13347 – PREFABRICATED WORK PLATFORMS:**

Delete Section 13347 in its entirety, and replace with new Section 13347 included as pages 54 through 63 of this Addendum No. 2.

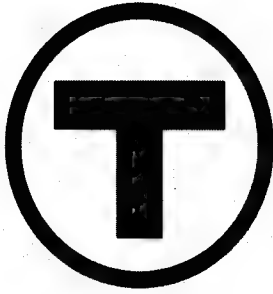
ITEM NO. 6**MODIFICATION TO DRAWING E1.11:**

On Plan 2 – WOMEN'S AND MEN'S TOILET – POWER PLAN of Drawing E1.11, at the door to the Men's Toilet Room, do not provide power door operator and associated accessories, hardware and wiring.

ITEM NO. 7**RESPONSES TO BIDDER QUESTIONS:**

1. Q. Are there any special qualifications for General Contractors?
A. There are no qualifications for General Contractors particular to this project beyond the standard MBTA requirements.
2. Q. Is there any need for coordination with the MBTA Power Department?
A. Refer to Paragraph 3.11 of Section 01568 – CONSTRUCTION SAFETY. The MBTA Power Department is not responsible for catenary inside of the Riverside Carhouse. The contractor shall cooperate with the Carhouse personnel to de-energize sections of the interior catenary as required to perform the Work. If the small Rooftop Unit RTU-1 cannot be fit through a clerestory window (per Drawing A3.11) and must be lifted over the exterior parapet, coordination with the MBTA Power Department will be required.
3. Q. As the platforms are primarily steel construction, can a steel company fabricate and install them?
A. Paragraph 1.4.A of Section 13347 – PREFABRICATED WORK PLATFORMS establishes the qualifications of the platform manufacturer. Fabrication of mezzanine systems is a specialty separate from Division 05 work.

4. Q. Are the steel columns inserted under the existing decks at the new platforms work of Section 13347?
- A. No – Steel columns inserted under the existing decks is work of Section 05100 – STRUCTURAL STEEL.
5. Q. Will a fire watch or detail be required for hot work?
- A. Refer to Section 01550 – HOT WORK for fire control procedures.
6. Q. Will the new work platforms support construction ladders or staging, in order to perform high level work (such as fire protection piping)?
- A. How high level work is performed is Contractor's means-and-methods. Section 13347 establishes structural loading requirements, but these requirements do not necessarily include additional construction loading.
7. Q. Can another inspection tour of the site be arranged?
- A. The Authority will not conduct another inspection tour of the site.



**MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY**

FTA GRANT NO. AND TITLE *TBD*

CONTRACT SPECIFICATIONS

for

MBTA Contract No. R20CN01

WORK PLATFORMS FOR RIVERSIDE

CARHOUSE

Newton, MA

JULY 2015

Baker | Wohl
ARCHITECTS

**132 LICOLN STREET #4
BOSTON, MA 02111**

determined in accordance with Section 01151 - MEASUREMENT AND PAYMENT (LUMP SUM).

2.10 CONTRACTOR PROPOSED CHANGES

- A. Contractor may at any time submit to the Engineer for the Engineer's review and approval or denial, proposed changes to the Contract Documents which will benefit the Authority. Upon acceptance of the proposed changes, the provisions of Article 2.2 and 2.4 (as applicable) shall apply. Denial of a proposed change shall neither provide the Contractor with any basis for claim for damages nor release the Contractor from contractual responsibilities.

2.11 COMMUNITY RELATIONS

- A. The Contractor shall establish and maintain a continuing liaison with persons residing or doing business in the vicinity of the Project site, for the purpose of minimizing inconveniences resulting from construction, and shall appoint a representative, acceptable to the Engineer, for community relations. The representative shall have the authority to act directly, or through the Contractor's approved Superintendent, regarding all valid requests or complaints. Information as to their disposition by the Contractor, shall be furnished to the Engineer. The name and telephone number of the Contractor's community relations representative shall be furnished to those residents or businessmen in the community who might reasonably be expected to be affected by the construction.

PART 3 - CONTROL OF WORK

3.1 AUTHORITY OF THE ENGINEER

- A. The Engineer will decide all questions relating to interpretation of the Contract Documents, and may alter, adjust, and approve same when necessary; all questions relating to quality, quantity, value, and acceptability of materials to be furnished and work provided or to be provided; all questions relating to progress of the Work and need for and manner of correcting same, and also the need for and terms of delays and suspensions; all questions relating to the need for and terms of Extra work; all questions relating to the supervision, control and direction of Work on the site and the use thereof; and all questions as to the acceptable fulfillment of the Contract by the Contractor.
- B. Attention of the Contractor is directed to the following limitations on the scope of the duties entrusted to the Engineer.
 - 1. The Regulations of the Authority's Board of Directors state that the General Manager is authorized to approve, without prior authorization of the Board, issuance of Change Orders or Extra Work Orders, pursuant to any Agreement previously authorized by the Board or the General Manager, in a total amount not exceeding 7% or \$15,000,000.00 above the contract price of such Agreement, whichever is greater; provided that if the issuance of any such Change Order or Extra Work Order would result in exceeding said 7% or \$5,000,000.00 limitation or if the issuance of any one such Change Order or Extra Work Order would require an expenditure by the Authority of an amount exceeding \$5,000,000.00, it shall not be issued without prior authorization of the Board.
 - 2. The General Manager, as provided by the Regulations of the Board of Directors, has delegated to the Assistant General Manager for Design and Construction the power to approve, without prior authorization of the General Manager or the Board, the issuance of Change Orders or

DIVISION 10: SPECIALTIES

10155	TOILET COMPARTMENTS	4
10400	FIXED SIGNAGE	8
10801	TOILET ACCESSORIES	4

DIVISION 11: EQUIPMENT

[NOT USED]

DIVISION 12: FURNISHINGS

[NOT USED]

DIVISION 13: SPECIAL CONSTRUCTION

13347	PREFABRICATED WORK PLATFORMS	10
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DIVISION 14: CONVEYING SYSTEMS

[NOT USED]

DIVISION 15: MECHANICAL

15050	BASIC MATERIALS AND METHODS FOR MECHANICAL WORK	29
15250	MECHANICAL INSULATION	12
15400	PLUMBING SYSTEMS	6
15500	FIRE PROTECTION	4
15600	HEATING, VENTILATING, AND AIR CONDITIONING	4
15800	AIR DISTRIBUTION	9

DIVISION 16: ELECTRICAL

16050	BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK	19
16121	INSULATED CONDUCTORS	3
16195	ELECTRICAL IDENTIFICATION	5
16450	GROUNDING	7
16471	DISTRIBUTION AND BRANCH CIRCUIT PANELBOARDS	7

General Decision Number: MA150001 05/08/2015 MA1

Superseded General Decision Number: MA20140001

State: Massachusetts

Construction Type: Building

Counties: Barnstable, Bristol, Dukes, Essex, Middlesex,
Nantucket, Norfolk and Suffolk Counties in Massachusetts.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes and apartments up to and including 4 stories)

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
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0	01/02/2015
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1	01/09/2015
---	------------

2	02/13/2015
3	03/06/2015
4	03/20/2015
5	04/17/2015
6	05/01/2015
7	05/08/2015

ASBE0006-001 09/01/2014

Rates	Fringes
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Insulator/asbestos worker

Includes the application
of all insulating
materials, protective
coverings, coatings, and
finishes to all types of
mechanical systems

(ZONE A).....\$ 43.31	24.15
(ZONE B).....\$ 38.98	24.15

ZONES:

ZONE A

BARNSTABLE COUNTY (Brewster, Chatham, Dennis, Eastham,

Harwich, Orleans, Provincetown, Truro, Wellfleet, Yarmouth)
BRISTOL COUNTY (Easton), MIDDLESEX COUNTY, and NORFOLK
COUNTY (Avon, Braintree, Brookline, Canton, Cohasset,
Dedham, Dover, Foxborough, Holbrook, Medfield, Medway,
Millis, Milton, Needham, Norfolk, Norwood, Quincy,
Randolph, Sharon, Stoughton, Walpole, Wellesley, Westwood,
Weymouth)

ZONE B

BARNSTABLE COUNTY (Barnstable, Bourne, Falmouth, Mashpee,
Sandwich), BRISTOL COUNTY (All cities except Easton), and
NORFOLK COUNTY (Bellingham, Franklin, Plainville)

ASBE0006-002 12/01/2014

BARNSTABLE (Brewster, Chatham, Dennis, Eastham, Harwich,
Orleans, Provincetown, Truro, Wellfleet and Yarmouth); BRISTOL
(Easton); ESSEX; MIDDLESEX; NORFOLK (Avon, Braintree,
Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Holbrook,
Hull, Medfield, Medway, Millis, Milton, Needham, Norfolk,
Norwood, Quincy, Randolph, Sharon Stoughton, Walpole,
Wellesley, Westwood, and Weymouth) AND SUFFOLK COUNTIES

Rates Fringes

HAZARDOUS MATERIAL HANDLER

(Includes preparation,
wetting, stripping, removal,
scrapping, vacuuming,
bagging and disposing of all
insulation materials from
mechanical systems whether
they contain asbestos or not)....\$ 31.18 17.80

ASBE0006-010 09/01/2014

BARNSTABLE (Barnstable, Bourne, Falmouth, Mashpee and
Sandwich); BRISTOL (Acushnet, Attleboro city, Berkeley,
Dartmouth, Dighton, Fairhaven, Fall river City, Freetown,
Marion, Mansfield, New Bedford City, North Attleboro, Norton,
Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton City and
Westport); DUKES; NANTUCKET; NORFOLK (Bellingham, Franklin,
Plainville, and Wrentham); PLYMOUTH (Lakeville, Mattapoisett,
Middleboro, Rochester and Wareham)

Rates Fringes

Insulator/asbestos worker

(Includes the application of

all insulating materials,

protective coverings,

coatings and finishes to all

types of mechanical systems.)....\$ 38.98 24.15

BOIL0029-001 10/01/2009

Rates Fringes

BOILERMAKER.....\$ 38.25 17.04

BRMA0001-008 09/01/2013

FOXBORO CHAPTER

BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North

Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton) AND

NORFOLK (Bellingham, Canton, Dedham, Foxboro, Franklin,

Norfolk, Norwood, Plainville, Sharon, Walpole, Westwood,

Wrentham) COUNTIES

Rates Fringes

Bricklayer, Cement Mason,

Plasterer.....\$ 45.96 29.74

BRMA0001-009 09/01/2013

LOWELL CHAPTER

MIDDLESEX (Acton, Asby, Ayer, Bedford, Billerica, Boxboro,

Carlisle, Chemsford, Dracut, Dunstable, Ft. Denvers, Groton,

Littleton, Lowell, North Acton, Pepperell, Shirley, South

Acton, Tewksbury, Townsend, Tyngsboro, West Acton, Westford,

Wilmington)

Rates Fringes

Bricklayer and plasterer.....\$ 45.96 29.74

BRMA0001-010 09/01/2013

LOWELL CHAPTER

MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson,

Maynard, Natick, Sherborn, Stow); and NORFOLK (Medfield,

Medway, Millis)

	Rates	Fringes
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BRICKLAYER.....	\$ 45.96	29.74
-----------------	----------	-------

BRMA0003-001 08/01/2014

	Rates	Fringes
--	-------	---------

Marble & Tile Finisher.....	\$ 37.37	27.20
-----------------------------	----------	-------

Marble, Tile & Terrazzo

Workers.....	\$ 49.00	28.72
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TERRAZZO FINISHER.....	\$ 47.90	28.55
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BRMA0003-003 08/01/2014

BOSTON CHAPTER

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford,

Melrose, Somerville); NORFOLK (Brookline, Milton); and SUFFOLK

	Rates	Fringes
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BRICKLAYER.....	\$ 48.96	28.77
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BRMA0003-006 08/01/2014

LYNN CHAPTER

ESSEX (Amesbury, Andover, Beverly, Boxford, Danvers, Essex,
Georgetown, Gloucester, Groveland, Hamilton, Haverhill,
Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead,
Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport,
North Andover, Peabody, Rockport, Rowley, Salisbury, Salem,
Saugus, Swampscott, Topsfield Wakefield, Wenham, West Newbury);
and MIDDLESEX (Reading, North Reading, Wakefield)

Rates Fringes

Bricklayer, cement mason and
plasterer.....\$ 48.96 28.77

BRMA0003-007 08/01/2014

WALTHAM CHAPTER

MIDDLESEX (Belmont, Burlington, Concord, Lexington, Lincoln,
Stoneham, Sudbury, Waltham, Watertown, Wayland, Weston,
Winchester, Woburn)

Rates Fringes

Bricklayer and plasterer.....\$ 48.96 28.77

BRMA0003-008 08/01/2014

NEWTON CHAPTER

MIDDLESEX (Newton) and NORFOLK (Dover, Needham, Wellesley)

Rates Fringes

Bricklayer, cement mason and
plasterer.....\$ 48.96 28.77

BRMA0003-009 08/01/2014

NEW BEDFORD

BARNSTABLE; BRISTOL (Acushnet, Darmouth, Farhaven, Fall River,
Freetown, New Bedford, Somerset, Swansea, Westport); DUKES; and
NANTUCKET COUNTIES

Rates Fringes

Bricklayer, cement mason and

plasterer.....\$ 48.96 28.77

BRMA0003-010 08/01/2014

QUINCY CHAPTER

NORFOLK COUNTY (Avon, Braintree, Cohasset, Holbrook, Quincy,
Randolph, Soughton, Weymouth)

Rates Fringes

Bricklayer, cement mason and

plasterer.....\$ 48.96 28.77

CARP0026-001 03/01/2015

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX
(Except Belmont, Cambridge, Everett, Malden, Medford,
Somerville); AND NORFOLK (Bellingham, Canton, Foxboro,
Franklin, Medfield, Medway, Millis, Needham, Norfolk, Norwood,
Plainville, Sharon, Walpole, Wellesley, Westwood, Wrentham)

Rates Fringes

CARPENTER.....\$ 35.75 26.88

CARP0033-001 03/01/2015

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford,
Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

Rates Fringes

CARPENTER.....\$ 42.30 27.38

CARP0056-011 08/01/2013

SUFFOLK (All of County); and those areas of BARNSTABLE,
BRISTOL, ESSEX, MIDDLESEX & NORFOLK COUNTIES situated inside
Boston Beltway (I-495) and North of Cape Cod Canal. ALL of
DUKES AND NANTUCKET COUNTIES

Rates Fringes

PILEDRIVERMAN.....\$ 40.10 28.57

CARP0056-012 08/01/2013

The areas of BARNSTABLE, BRISTOL, and NORFOLK COUNTIES situated
OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
--	-------	---------

PILEDRIVERMAN.....	\$ 40.10	28.57
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CARP0056-013 08/01/2013

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE
Boston Beltway (I-495)

	Rates	Fringes
--	-------	---------

PILEDRIVERMAN.....	\$ 40.10	28.57
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CARP0424-003 03/01/2015

NORFOLK COUNTY (Braintree, Cohasset, Scituate, Weymouth,
Quincy)

Rates Fringes

CARPENTER.....\$ 35.75 26.88

CARP0624-005 03/01/2015

DUKES; NANTUCKET

Rates Fringes

CARPENTER.....\$ 42.30 27.38

CARP0624-007 03/01/2015

BARNSTABLE; BRISTOL (Except Attleboro & North Attleboro); AND

NORFOLK (Avon, Holbrook, Randolph, Stoughton) COUNTIES

Rates Fringes

CARPENTER.....\$ 35.75 26.88

* CARP1121-001 04/01/2015

Rates Fringes

MILLWRIGHT.....\$ 36.64 27.88

CARP2168-001 09/01/2014

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford,
Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

Rates Fringes

FLOOR LAYER: Carpet.....\$ 40.40 27.61

CARP2168-004 09/01/2014

BRISTOL; ESSEX; MIDDLESEX (Except Belmont, Cambridge, Everett,
Malden, Medford, Somerville); Remainder of Norfolk County

Rates Fringes

FLOOR LAYER: Carpet.....\$ 40.40 27.61

CARP2168-005 09/01/2014

BARNSTABALE; DUKES; AND NANTUCKET

Rates Fringes

FLOOR LAYER: Carpet.....\$ 40.40 27.61

ELEC0096-001 12/01/2014

MIDDLESEX (Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton,
Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend)

Rates Fringes

ELECTRICIAN.....\$ 38.37 14%+16.41

Teledata System Installer.....\$ 26.25 3%+18.87

ELEC0099-001 12/01/2014

BRISTOL (Attleboro, North Attleboro, Seekonk)

Rates Fringes

ELECTRICIAN.....\$ 35.33 60.73%

Teledata System Installer.....\$ 26.50 13.87%+13.57

ELEC0103-001 03/01/2015

ESSEX; MIDDLESEX (Excluding Ashby, Ashland, Ayer, Ft. Devens,
Groton, Hopkinton, Hudson, Marlboro, Pepperell, Shirley, Stow,
Townsend); NORFOLK (Excluding Avon, Holbrook, Plainville,
Randolph, Stoughton) SUFFOLK

	Rates	Fringes
Teledata System Installer.....	\$ 33.88	27.21

ELEC0103-002 03/01/2015

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland,
Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport,
North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX
(Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford,
Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury,
Tyngsboro, Westford, Wilmington)

	Rates	Fringes
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ELECTRICIAN.....\$ 45.17 29.08

ELEC0103-004 03/01/2015

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich,
Manchester, Marblehead, Middleton, Peabody, Rockport, Salem,
Topsfield, Wenham)

Rates Fringes

ELECTRICIAN.....\$ 45.17 29.08

ELEC0103-005 03/01/2015

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX
(Acton, Arlington, Belmont, Cambridge, Concord, Everett,
Framingham, Holliston, Lexington, Lincoln, Malden, Maynard,
Medford, Melrose, Natick, Newton, Reading, Sherborn,
Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown,
Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham,
Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro,
Franklin, Medfield, Medway, Millis, Milton, Needham, Norfolk,
Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood,
Weymouth, Wrentham); PLYMOUTH (Hingham and Hull); SUFFOLK

	Rates	Fringes
ELECTRICIAN.....	\$ 45.17	29.08

ELEC0104-001 08/31/2014

	Rates	Fringes
Line Construction:		
Cableman.....	\$ 43.51	21.64+A
Equipment Operator.....	\$ 36.98	18.93+A
Groundman.....	\$ 23.93	12.26+A
Lineman.....	\$ 43.51	21.64+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day;
 Independence Day; Labor Day; Thanksgiving Day; Christmas
 Day and Columbus Day, provided the employee has been
 employed 5 working days prior to any one of the listed
 holidays.

ELEC0223-005 09/01/2014

BARNSTABLE; BRISTOL (Except Attleboro, North Attleboro,
Seekonk); DUKES; NANTUCKET AND NORFOLK (Avon, Halbrook,
Plainville, Randolph, Stoughton)

Rates Fringes

ELECTRICIAN.....\$ 37.31 27.75%+9.70

ELEC0223-006 09/01/2014

BARNSTABLE; BRISTOL (Except Attleboro, North Attleboro,
Seekonk); DUKES; NANTUCKET AND NORFOLK (Avon, Halbrook,
Plainville, Randolph, Stoughton)

Rates Fringes

Teledata System Installer.....\$ 37.31 27.75%+9.70

ELEV0004-001 01/01/2015

Rates Fringes

ELEVATOR MECHANIC.....\$ 53.30 28.385+a+b

FOOTNOTE FOR ELEVATOR MECHANICS:

a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

ENGI0004-001 12/01/2014

Rates Fringes

Power equipment operators:

Group 1.....	\$ 42.39	25.14+A
Group 2.....	\$ 41.99	25.14+A
Group 3.....	\$ 29.40	25.14+A
Group 4.....	\$ 35.33	25.14+A
Group 5.....	\$ 21.90	25.14+A
Group 6.....	\$ 25.54	25.14+A

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday,

Labor Day, Memorial Day, Independence Day, Patriot's Day,
Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):

Over 150 ft. +2.12

Over 185 ft. +3.72

Over 210 ft. +5.23

Over 250 ft. +7.92

Over 295 ft. +10.97

Over 350 ft. +12.76

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

Group 1: Crane; shovel; truck crane; cherry picker;
dragline; trench hoe; backhoe; three drum machine; derrick;
pile driver; elevator tower; hoist; gradall; shovel dozer;
front end loader; fork lift; sugar; boring machine; rotary
drill; post hole hammer; post hole digger; pumpcrete
machine; asphalt plant (on site); concrete batching and/or
mixing plant (on site); crusher plant (on site); paving
concrete mixer; timber jack

Group 2: Sonic or vibratory hammer; grader; scraper; tandem
scraper; concrete pump; bulldozer; tractor; york rake;
mulching machine; portable steam boiler; portable steam
generator; roller; spreader; tamper (self propelled or
tractor drawn); asphalt paver; mechanic - maintenance;

paving screed machine; stationary steam boiler; paving
concrete finishing machine; cal truck; ballast regulator;
switch tamper; rail anchor machine; tire truck

Group 3: Pumps (1-3 grouped); compressor; welding machine
(1-3 grouped); generator; concrete vibrator; heater (power
driven 1- 5); well point system (operating);
syphon-pulsometer; concrete mixer; valves controlling
permanent plant air or steam; conveyor; Jackson type
tamper; single diaphragm pump; lighting plant

Group 4: Assistant engineer (fireman)

Group 5: Oiler (other than truck cranes and gradalls)

Group 6: Oiler (on truck cranes and gradalls) stant engineer
(on truck crane and gradall)

IRON0007-006 03/16/2015

AREA 1: BRISTOL (Easton); ESSEX (Beverly, Gloucester,
Lynn,Lynnfield, Manchester, Marblehead, Nahant, Rockport,
Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford,
Belmont, Burlington, Cambridge, Carlisle, Concord, Dunstable,
Everett, Framingham, Lexington, Lincoln, Malden, Maynard,
Medford, Melrose, Natick, Newton, Reading, Sherborn,
Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown,
Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway);

SUFFOLK

AREA 2: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex,
Georgetown, Hamilton, Haverhill, Ipswich, Lawrence, Merrimac,
Methuen, Newbury, Newburyport, North Andover, Rowley,
Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action,
Billerica, Chelmsford, Dracut, Groton, Groveland, Littleton,
Lowell, Middleton, North Reading, Pepperell, Tewksbury,
Tyngsboro, Westford, Wilmington)

	Rates	Fringes
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Ironworkers:

AREA 1.....	\$ 42.11	28.67
AREA 2.....	\$ 37.70	28.67

IRON0007-010 03/16/2015

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton,
Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

	Rates	Fringes
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IRONWORKER.....\$ 41.81 28.67

IRON0037-005 03/16/2014

BARNSTABLE; BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth,
Dighton, Fairhaven, Fall River, Freetown, Mansfield, New
Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk,
Somerset, Swansea, Taunton, Westport); DUKES; NANTUCKET;
NORFOLK (Billingham, Franklin, Plainville, Wrentham)

Rates Fringes

IRONWORKER.....\$ 33.56 22.77

LABO0014-001 06/01/2011

Rates Fringes

Plasterer tender

BARNSTABLE, BRISTOL,
DUKES, ESSEX, NANTUCKET,
MIDDLESEX (with the
exception of Arlington,
Belmont, Burlington,

Cambridge, Everett,
 Malden, Medford, Melrose,
 Reading, Somerville,
 Stoneham, Wakefield,
 Winchester, Winthrop and
 Woburn); NORFOLK (with the
 exception of Brookline
 Dedham and Milton) COUNTIES.\$ 28.60 19.00
 SUFFOLK COUNTY (Boston,
 Chelsea, Revere, Winthrop,
 Deer Island, Nut Island);
 MIDDLESEX COUNTY
 (Arlington, Belmont,
 Burlington, Cambridge,
 Everett, Malden, Medford,
 Melrose, Reading,
 Somerville, Stoneham,
 Wakefield, Winchester,
 Winthrop and Woburn only);
 NORFOLK COUNTY (Brookline,
 Dedham, and Milton only)....\$ 31.05 19.90

LABO0022-009 12/01/2012

SUFFOLK COUNTY (Boston, Chelsea, Revere, Winthrop, Deer & Nut

Islands); MIDDLESEX COUNTY (Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop, and Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton only)

	Rates	Fringes
Laborers:		
Group 1.....	\$ 32.30	20.40
Group 2.....	\$ 32.55	20.40
Group 3.....	\$ 33.05	20.40
Group 4.....	\$ 33.30	20.40
Group 5.....	\$ 33.05	20.40
Group 6.....	\$ 34.30	20.40
Group 7.....	\$ 20.50	20.40

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; Carpenter Tenders

GROUP 2: Jackhammer operator; pavement breaker; asphalt raker carbide core drilling machine; chain saw operator; pipelayer; barco type jumping tampers; laser beam; concrete

pump; mason tender; motorized mortar mixer; ride-on
motorized buggy; fence and beam rail erector

GROUP 3: Air track, block paver; rammer; curb setter,
hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Pre-cast floor and roof plank erector

GROUP 6: Asbestos removal laborers/haz-mat laborers

GROUP 7: Flaggers

LABO0022-010 12/01/2012

Counties of BARNSTABLE; BRISTOL; DUKES; ESSEX; NANTUCKET;
MIDDLESEX (with the exception of Arlington, Belmont,
Burlington, Cambridge, Everett, Malden, Medford, Melrose,
Reading, Somerville, Stoneham, Wakfield, Winchester, Winthrop
and Woburn); NORFOLK (with the exception of Brookline, Dedham
and Milton)

	Rates	Fringes
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Laborers:

Group 1.....	\$ 29.60	19.50
Group 2.....	\$ 29.85	19.50
Group 3.....	\$ 30.35	19.50
Group 4.....	\$ 30.60	19.50
Group 5.....	\$ 30.35	19.50
Group 6.....	\$ 31.60	19.50

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; Carpenter Tenders

GROUP 2: Jackhammer operator; pavement breaker; asphalt
raker carbide core drilling machine; chain saw operator;
pipelayer; barco type jumping tampers; laser beam; concrete
pump; mason tender; motorized mortar mixer; ride-on
motorized buggy; fence and beam rail erector

GROUP 3: Air track, block paver; hammer; curb setter,
hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Pre-cast floor and roof plank erector

GROUP 6: Asbestos removal laborers/haz-mat laborers

LABO1421-004 06/01/2014

BARNSTABLE, BRISTOL, DUKES, ESSEX, MIDDLESEX, NANTUCKET NORFOLK
AND SUFFOLK COUNTIES

Rates Fringes

Laborers: (Wrecking)

Group 1.....	\$ 34.25	20.85
Group 2.....	\$ 35.00	20.85
Group 3.....	\$ 35.25	20.85
Group 4.....	\$ 30.25	20.85
Group 5.....	\$ 33.35	20.85
Group 6.....	\$ 34.25	20.85

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type

Loaders, Hydraulic "Brock" Type Hammer Operators, Concrete

Cutting Saws.

Group 4: Yardman (Salvage Yard Only).

Group 5: Yardman, Burners, Sawyers.

Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0011-007 06/01/2014

BARNSTABLE, BRISTOL, DUKES, AND NANTUCKET COUNTIES

	Rates	Fringes
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GLAZIER.....	\$ 34.58	18.55+A
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FOOTNOTE:

A. PAID HOLIDAY: LABOR DAY (provided employee has worked any part of the week prior to Labor Day and any part of the week after Labor Day)

PAIN0035-004 01/01/2015

BARNSTABLE; BRISTOL; ESSEX; NANTUCKET; DUKES; COUNTIES;
REMAINDER OF NORFOLK; MIDDLESEX AND SUFFOLK COUNTIES

Rates Fringes

Painters:

NEW CONSTRUCTION:

Brush, Taper.....\$ 36.26 25.95

Spray, Sandblast.....\$ 37.66 25.95

REPAINT:

Brush, Taper.....\$ 34.32 25.95

Spray, Sandblast.....\$ 35.72 25.95

PAIN0035-013 01/01/2015

MIDDLESEX (Cambridge, Everett, Malden, Medford, Somerville)

SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

Rates Fringes

Painters:

NEW CONSTRUCTION:

Brush, Taper.....\$ 42.05 25.95

Spray, Sandblast.....\$ 43.45 25.95

REPAINT:

Brush, Taper.....\$ 40.11 25.95

Spray, Sandblast.....\$ 41.51 25.95

PAIN0035-020 01/01/2015

ESSEX; MIDDLESEX; NORFOLK; SUFFOLK

Rates Fringes

GLAZIER.....\$ 36.26 25.95

PLAS0534-001 07/01/2014

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 37.25 32.26

PLAS0534-004 07/01/2014

MIDDLESEX; NORFOLK AND SUFFOLK COUNTIES

Rates Fringes

PLASTERER.....\$ 37.25 32.26

PLUM0004-001 09/01/2014

MIDDLESEX (Ashby, Ayer-West of Greenville branch of Boston and
Maine Railroad, Ft. Devens, Groton, Shirley, Townsend)

	Rates	Fringes
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Plumbers and Pipefitters.....	\$ 41.11	24.71
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PLUM0012-005 09/01/2013

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,
Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,
Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen,
Middleton, Newbury, Newburyport, North Andover, Peabody,
Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West
Newbury)

	Rates	Fringes
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PLUMBER.....	\$ 44.98	24.56
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PLUM0012-007 09/01/2013

ESSEX (Lynn, Lynnfield, Nahant, Saugus, and Swampscott);
MIDDLESEX (Acton, Arlington, Ashford, Ayer-except west of
Greenville Branch of Boston & Maine Rail Road, Bedford,
Belmont, Billerica, Boxboro, Burlington, Cambridge, Carlise,
Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,
Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton,
Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,
Newton, North Reading, Pepperell, Reading, Sherborn,
Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,
Wakefield, Watham, Watertown, Wayland, Westford, Wilmington,
Winchester and Woburn), NORFOLK (Bellingham, Braintree,
Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,
Medford, Medway, Millis, Milton, Needham, Norfolk, Norwood,
Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,
Weymouth and Wrentham); PLYMOUTH (Hingham, Hull, Scituate);
SUFFOLK; WORCESTER (Hopedale and Southboro)

	Rates	Fringes
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PLUMBER.....	\$ 49.06	24.56
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PLUM0051-004 03/01/2014

BARNSTABLE; BRISTOL; DUKES; NANTUCKET; AND NORFOLK (Avon,
Holbrook, Randolph, Stoughton) COUNTIES

Rates Fringes

Plumbers and Pipefitters.....\$ 35.51 27.32

PLUM0537-005 03/01/2015

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,
Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,
Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead,
Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport,
North Andover, Peabody, Rockport, Rowley, Salem, Salisbury,
Saugus, Swampscott, Topsfield, Wenham, West Newbury); MIDDLESEX
(Acton, Arlington, Ashford, Ayer-except west of Greenville
Branch of Boston & Maine Rail Road, Bedford, Belmont,
Billerica, Boxboro, Burlington, Cambridge, Carlisle,
Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,
Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton,
Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,
Newton, North Reading, Pepperell, Reading, Sherborn,
Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,

Wakefield, Watham, Watertown, Wayland, Westford, Wilmington,
 Winchester and Woburn), NORFOLK (Bellingham, Braintree,
 Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,
 Medford, Medway, Millis, Milton, Needham, Norfolk, Norwood,
 Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,
 Weymouth and Wrentham); PLYMOUTH (Hingham, Hull, Scituate);
 SUFFOLK; WORCHESTER (Hopedale and Southboro)

	Rates	Fringes
PIPEFITTER.....	\$ 49.69	27.76

 ROOF0033-001 08/01/2014

	Rates	Fringes
Roofers: All Tear-off and/or removal of any types of roofing and all spudding, sweeping, vacuuming and/or cleanup of any and all areas of any type where a roof is to be relaid.....	\$ 39.21	22.92

SFMA0550-001 01/01/2014

BRISTOL (Portion within 35 mile radius from Boston City Hall;
ESSEX; MIDDLESEX (Except Ashby, Townsend, and portions of
Pepperell and Shirley beyond 35 mile radius from Boston City
Hall); NORFOLK; PLYMOUTH (Portion within 35 mile radius of
Boston City Hall); SUFFOLK

	Rates	Fringes
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SPRINKLER FITTER.....	\$ 53.33	22.08
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SFMA0550-002 01/01/2014

BRISTOL (Seekonk, Swansea, and Somerset)

	Rates	Fringes
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SPRINKLER FITTER.....	\$ 39.40	21.05+a
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a. PAID HOLIDAYS: Memorial Day, July 4th, Labor Day,
Thanksgiving Day and Christmas Day, provided the employee
has been in the employment of a contractor 20 working days

prior to any such paid holiday.

SFMA0669-001 01/01/2014

BARNSTABLE; BRISTOL (Beyond 35 mile radius of Boston City Hall); DUKES; MIDDLESEX (Ashby, Townsend, portions of Pepperell and Shirley beyond 35 mile radius of Boston City Hall); NANTUCKET; PLYMOUTH (Beyond 35 mile radius of Boston City Hall)

	Rates	Fringes
SPRINKLER FITTER.....	\$ 39.40	21.05

SHEE0017-003 02/01/2012

BRISTOL (Attleboro, Berkley, Easton, Mansfield, North Attleboro, Norton, Raynham, Taunton); ESSEX; MIDDLESEX; NORFOLK; PLYMOUTH (except except Marion, Mattapoisett, Rochester, Wareham); SUFFOLK

	Rates	Fringes
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Sheet metal worker.....\$ 40.79 28.83

SHEE0017-007 02/01/2012

BARNSTABLE; BRISTOL (Acushnet, Assonet, Dartmouth, Dighton,
Fairhaven, Fall River, Freetown, New Bedford, Rehoboth,
Seekonk, Somerset, Swansea, Westport); DUKES; AND NANTUCKET

Rates Fringes

Sheet metal worker.....\$ 40.79 28.83

TEAM0379-001 08/01/2013

Rates Fringes

Truck drivers:

Group 1.....	\$ 30.78	18.37+A+B
Group 2.....	\$ 30.95	18.37+A+B
Group 3.....	\$ 31.02	18.37+A+B
Group 4.....	\$ 31.14	18.37+A+B
Group 5.....	\$ 31.24	18.37+A+B
Group 6.....	\$ 31.53	18.37+A+B
Group 7.....	\$ 31.82	18.37+A+B

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE

TUNNEL WORK (UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE

HAZARDOUS MATERIALS (IN HOT ZONE ONLY) \$2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons

other than conventional type trucks; low bed; vachual;

mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number,

005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION

SECTION 13347

PREFABRICATED WORK PLATFORMS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: This Section specifies the following items.

1. Prefabricated work platforms of types indicated.
 - a. The basis of concept for work platforms of this contract is a prototype installed at the MBTA's Reservoir Carhouse, at the east end of the Carhouse between Tracks 5 and 6. This existing work platform demonstrates concepts, and quality of materials, finishes, products and workmanship for this project, except as otherwise indicated. Alternate means of achieving indicated System Requirements from those utilized on this existing work platform will be considered.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 15400 – PLUMBING for compressed air piping and outlets to be supplied and attached to work platforms.
2. Section 15500 – FIRE PROTECTION for sprinkler system to be supplied and attached to work platforms.
3. Section 16050 – BASIC MATERIALS AND METHODS FOR ELECTRICAL WORK for electrical conduit and wiring, switches, and power receptacles to be supplied and attached to work platforms.
4. Section 16500 – LIGHTING for lighting fixtures to be supplied and attached to work platforms.

1.2 SYSTEM REQUIREMENTS

A. Structural Performance of Work Platforms: Provide work platforms, including stairs and railings, capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. General: All steel components shall meet the requirements of the 8th Edition of the Massachusetts State Building Code.
2. Platform Live Loads:
 - a. Platforms shall support a uniform live load of 60 psf.
 - b. Work Platforms Type A2 (at Riverside) shall support a concentrated live load of 4,000 lbs spread over ten square feet, in addition to the uniform live load.
3. Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - a. Handrails:
 - 1) Uniform load of 50 lbf/ ft. applied in any direction.

- 2) Concentrated load of 200 lbf applied in any direction.
 - 3) Uniform and concentrated loads need not be assumed to act concurrently.
 - b. Top Rails of Guards:
 - 1) Uniform load of 50 lbf/ ft. applied in any direction.
 - 2) Concentrated load of 200 lbf applied in any direction.
 - 3) Uniform and concentrated loads need not be assumed to act concurrently.
 - c. Infill of Guards:
 - 1) Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - 2) Infill load and other loads need not be assumed to act concurrently.
 - d. Toe Kicks:
 - 1) Concentrated load of 50 lbf applied in any direction.
 4. Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.
- B. Structural Anchorage:** Provide anchorage compatible with existing conditions and proposed sub-columns beneath concrete rail platforms.
- C. Seismic Performance:** Provide work platforms capable of withstanding the effects of earthquake motions determined according to Code. The following parameters shall be used to determine the seismic loads:
1. Building Occupancy Category: II.
 2. Site Soil Classification: D.
 3. Spectral Response Acceleration at short periods: $S_S = 0.29$.
 4. Spectral Response Acceleration at 1 second: $S_1 = 0.068$.
- D. Safety Performance:** Comply with OSHA (Occupational Safety & Health Administration) regulations.
- E. Operable Sections:** Sliding and folding extensions shall operate easily, smoothly and without binding. In the extended position, sliding and folding extensions shall be locked in place.
- F. Control of Corrosion:** Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- G. Coordination with Other Work:** Provide points of attachment for compressed air piping and outlets, sprinkler systems, electrical work and lighting.

1.3 SUBMITTALS

- A. Product Data:**
1. Product data for each type of finish coating required, including material data sheets and recommendations for maintenance and cleaning of coated surfaces.
- B. Shop Drawings:** Include plans, elevations, sections, details, and attachments to other work.
1. Provide templates for anchors and bolts specified for installation under other Sections.

2. Indicate methods of attachment for other work, including compressed air piping and outlets, sprinkler systems, electrical work and lighting.
 3. Indicate means of operating sliding or folding extensions.
- C. Erection Plans: For each work platform, indicate:
1. Preassembled units for shipping and delivery to site.
 2. Means of delivery of units into Riverside Carhouse.
 - a. Comply with requirements of Section 01013 – LIMITATIONS OF WORK and Section 01568 – CONSTRUCTION SAFETY.
 3. Method of attaching preassembled units together on site.
 4. Means of securing incomplete work in place at the end of each work day, in accordance with Section 01013 – LIMITATIONS OF WORK.
- D. Structural Calculations: For installed products indicated to comply with structural loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation.
- E. Welding certificates. Qualifications for welding procedures and welders.
- F. Weld inspection reports.
- G. Qualification Data: For professional engineer licensed in the Commonwealth of Massachusetts.
- H. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
1. Structural Steel including chemical and physical properties.
 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
- I. Maintenance Data: For each type of work platform to include in maintenance manuals specified in Division 1.
- J. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The manufacturer shall be an established firm with a minimum ten years of experience in the design and fabrication of custom, freestanding mezzanine systems.
- B. Finisher Qualifications: Firm experienced in successfully applying shop-applied color finishes similar to that indicated for this Project.
- C. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual", for class of stair designated, unless more stringent requirements are indicated.
1. Preassembled Stairs: Commercial class.

- D. As a minimum, welds shall be visually inspected.

1.5 COORDINATION

- A. Field Measurements: Verify actual locations of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Mark out on site each connection point to existing construction.
- B. Coordinate installation of anchorages for work platforms. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store work of this Section in a manner to prevent stress, wracking, or bending of components, and to prevent mechanical damage, damage to shop-applied finishes, or damage by the elements.
- B. Shop-finished items which become rusted, marred, or damaged because of non-compliance with these conditions will be rejected, and such items shall be replaced at no additional cost to the Owner.

1.7 WARRANTIES

- A. Fabrication Warranty: Submit a written warranty, executed by the platform manufacturer, agreeing to repair or replace structural and operable components that fail within the specified warranty period.

- 1. Warranty Period: 25 years after the date of Substantial Completion.

- B. Metal Finish Warranty: Submit a written warranty, executed by the coating manufacturer, agreeing to repair or replace finishes that fail in materials within the specified warranty period. Failures include but are not necessarily limited to deterioration of metal finishes beyond normal weathering.

- 1. Warranty Period: 10 years after the date of Substantial Completion.

- C. Flooring Panels Warranty: Submit a written warranty, executed by the flooring panel manufacturer, agreeing to repair or replace product that fail in materials within the specified warranty period. Failures include but are not necessarily limited to manufacturing defect, delamination, finish or structural capacity.

- 1. Warranty Period: 7 years after the date of Substantial Completion.

- D. The warranties shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
1. Prefabricated Work Platforms:
 - a. Cubic Designs Mezzanine Systems, New Berlin, WI (represented by Brodie Toyota-Lift, Shrewsbury, MA).
 - b. American Warehouse Systems, Blaine MN.
 - c. Mezzanine Built, of Panel Built, Inc., Blairsville, GA.
 - d. Grace Material Handling, Gillette, NJ.
 - e. Or approved equal.
 2. Flooring Panels:
 - a. Coated 3/4" LD ResinDek, by Cornerstone Specialty Wood Products, LLC.
 - b. I-Tech Resin Decking For Mezzanines, by Innovative Panel Technologies, Inc.
 - c. Resin Board, by Cogan Wire and Metal Products, Ltd.
 - d. Or approved equal.
 3. Fall Protection Netting:
 - a. US Netting, Inc [<http://www.usnetting.com/cargo-netting-selection-guide.html>].
 - b. Incord [www.incord.com].
 - c. Talco Specialties, Inc [www.talcospecialties.com/cargo-net.aspx].
 - d. Or approved equal.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn)
- C. Steel Deck: Type B Roof Deck, ASTM A 1008, Grade C.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M commercial steel, Type B, or ASTM A 1018/A 1018M High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F) Grade 50, unless another grade is required by design loads.

2.4 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. All structural fasteners shall be minimum 3/4" diameter SAE J429 Grade 1.

2.5 FLOORING PANELS

- A. Composition: Wood fiber, urea and melamine resins and wax emulsifier combined under heat and pressure to form panels capable of supporting specified loads; formaldehyde free.
- B. Thickness: 3/4" thick.
- C. Edge: Tongue and groove on long sides.
- D. Finish: Slip-resistant surface.

2.6 FALL PROTECTION NETTING

- A. Polyester Webbing:
 - 1. Mesh size: Three-inch square.
 - 2. Web size: One-inch wide.
 - 3. Breaking Strength: 6,000 lbs.
 - 4. Color: Orange.
- B. Carabineer Hooks:
 - 1. Material: Stainless steel.
 - 2. Breaking Strength: 6,000 lbs.
 - 3. Type: Double action.
 - 4. Anchor Style: C/1 and C/2, as defined by US Netting.

2.7 PERSONAL PROTECTIVE EQUIPMENT SYSTEM

- A. Lanyard:
 - 1. Type: Self-retracting, designed for use single user with full-body harness.
 - 2. Standards: Compliant with ANSI Z359.1, ANSI Z359.14, OSHA, and ANSI A10.32.
 - 3. Specifications:
 - a. Capacity: 75 – 310 lbs.
 - b. Maximum Arrest Force: 1350 lbs.
 - c. Maximum Arrest Distance: 24 inches.
 - d. Average Locking Speed: 4.5 feet per second.
 - e. Arc Flash Rated: ASTM F887-05.
 - 4. Lifeline Material: 0.1 x 1 inch Kevlar/Nomex webbing.
- B. Cable: 1/2 inch stainless steel, with turnbuckle ends.
- C. Cable Line Traveler: Tandem, designed to carry lanyard over cable.

2.8 MISCELLANEOUS MATERIALS

- A.** Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.9 FABRICATION, GENERAL

- A.** Comply with requirements of the American Institute of Steel Construction (AISC) "CODE OF STANDARD PRACTICE".
- B.** Provide complete work platform assemblies, including metal framing, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor platforms on supporting structure.
 - 1. Join components by welding, unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- C.** Preassembled Platforms: Assemble work platforms in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D.** Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- E.** Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F.** Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- G.** Match abutting cross-sectional configurations exactly.
- H.** Fill, grind or otherwise remove all manufacturer's identification marks.
- I.** Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - 6. Seams of hollow structural sections shall be filled and ground flush and smooth.
- J.** Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

- K. Fasten flooring panels from underneath steel floor deck, so that no fasteners are visible from above.

2.10 STEEL FRAMING

- A. Framing:
 - 1. Construct platforms and sliding extension sections of steel plate or channel headers and miscellaneous framing members as needed to comply with performance requirements.
 - 2. Fabricate stair stringers of steel plates or channels.
- B. Metal Stairs: Form risers and treads to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch.
 - 1. Steel Sheet: Uncoated hot-rolled steel sheet, unless otherwise indicated.
 - 2. Shape metal treads to include nosing integral with riser.

2.11 STEEL TUBE RAILINGS

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
- B. Form changes in direction of railings as detailed on the Drawings.
- C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- D. Close exposed ends of railing members with prefabricated end fittings.
- E. Flanges, Fittings, and Anchors: Provide end closures, flanges, miscellaneous fittings, and anchors for interconnecting components.

2.12 METAL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. High Performance Organic Coating: Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 - 1. Fluorocarbon 2 Coat Coating System: Manufacturer's standard 2 coat thermo-cured system, complying with AAMA 2605, composed of specially formulated inhibitive primer and fluorocarbon color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a total dry film thickness of not less than 1.3 mil.
 - 2. Color and Gloss: As selected by the Authority from manufacturer's standard choices for color and gloss.

3. Number of Colors: Three, as follows:
 - a. General: As selected by the Authority.
 - b. Railings, Guards and Boots: Safety yellow.
 - c. Underside of decking: Reflective white.
- C. Finish all exposed work with indicated high performance organic coating.
 1. General: Spray apply coating systems to extrusions and fabricated shapes in the thicknesses indicated, complying with manufacturer's instructions for surface preparation, application method, source quality control, and film thickness.
 2. Where fabrication of ferrous metal is required after coating application, apply touch up coating to cut edges after fabrication to restore uniform coating membrane over entire surface.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners as indicated for securing work platforms to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Placement: Set work platforms accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

3.2 ADJUSTING AND CLEANING

- A. Adjust operable sections and personal protection devices to operate properly.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

- A. Separate measurement and payment will not be made for work under this section, but all costs in connection therewith shall be included in the total Contract Lump Sum price for Item 0130.174 – MAINTENANCE FACILITY.

ITEM NO.	DESCRIPTION	UNIT
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MBTA CONTRACT NO. R20CN01

WORK PLATFORMS FOR RIVERSIDE CARHOUSE

NEWTON, MASSACHUSETTS

ADDENDUM NO. 3

The attention of bidders submitting bids for the above project is called to the following Addendum to the General Conditions, Supplementary Conditions, Construction Specifications and Contract Drawings.

The items set forth herein, whether of omission, addition or substitution are to be included in and form a part of the Bid submitted.

THE NUMBER OF THIS ADDENDUM (NO. 3) MUST BE ENTERED IN THE SPACE PROVIDED ON PAGE 00410-3 OF THE FORM FOR BID IN THE BID FORM.

August 21, 2015

By: Frank DePaola
Interim General Manager of the MBTA

ITEM NO. 1

MODIFICATION TO SECTION 13347 – PREFABRICATED WORK PLATFORMS:

In SECTION 13347 – PREFABRICATED WORK PLATFORMS, remove and replace Paragraph 1.2.E with the following new paragraph:

- E. Operable Sections: Sliding extensions shall operate easily, smoothly and without binding. In the extended position, sliding extensions shall be locked in place.

ITEM NO. 2

RESPONSES TO BIDDER QUESTIONS:

- 1. Q. How are the extensions controlled? Manual, Air, Etc?
 - A. The basis of concept prototype work platform installed at the MBTA's Reservoir Carhouse has extensions that are manually controlled. Alternate means may be provided, subject to the System Requirements of Paragraph 13347-1.2.E.
- 2. Q. Do they plan on using more than one extended area at a time?
 - A. Yes.
- 3. Q. Could we offer a flip down option in place of the extension?
 - A. No. Hinged sections that fold down to extend out to the train cars was reviewed and rejected by the MBTA Safety Department.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MBTA CONTRACT NO. R20CN01

WORK PLATFORMS FOR RIVERSIDE CARHOUSE

NEWTON, MASSACHUSETTS

ADDENDUM NO. 4

The attention of bidders submitting bids for the above project is called to the following Addendum to the NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, and the Construction Specifications.

The items set forth herein, whether of omission, addition or substitution are to be included in and form a part of the Bid submitted.

THE NUMBER OF THIS ADDENDUM (NO. 4) MUST BE ENTERED IN THE SPACE PROVIDED ON PAGE 00410-3 OF THE FORM FOR BID IN THE BID FORM.

August 25, 2015

By: Frank DePaola
Interim General Manager of the MBTA

ITEM NO. 1

MODIFICATION TO NOTICE TO BIDDERS – BID DATE POSTPONED:

On Page 1 of the NOTICE TO BIDDERS, remove and replace the second paragraph with the following new paragraph:

Electronic bids for MBTA Contract No. R20CN01, WORK PLATFORMS FOR RIVERSIDE CARHOUSE, Newton, Massachusetts (CLASS 1, GENERAL TRANSIT CONSTRUCTION AND PROJECT VALUE - \$2,730,630.00), can be submitted at www.bidx.com until two o'clock (2:00 p.m.) on **September 3, 2015**. Immediately thereafter, in a designated room, the Bids will be opened and read publicly.

ITEM NO. 2

REPLACE A PAGE OF SECTION 00410 – BID FORMS AND SUPPLEMENTS:

Replace page 27 of Section 00410 – BID FORMS AND SUPPLEMENTS with the new page 27 included as page 3 of this Addendum No. 4.

ITEM NO. 3

MODIFICATION TO SECTION 01590 – FIELD OFFICE AND SHEDS:

Two of the three tablet computers required by paragraph 01590-2.3.A.25.b shall become the property of the MBTA upon completion of the work. All other equipment for Engineer's field office shall remain property of the Contractor upon completion of the work, in accordance with paragraph 01590-2.3.A.

ITEM NO. 4

RESPONSES TO BIDDER QUESTIONS:

1. Q. The specs say 3 day for the certification paperwork on page 00200-7 Instruction to Bidders. On the sample Bid Form I believe we have to declare the DBE's and the amounts (please confirm) page. This is form A. Form B Letter of Intent on the following page (00410-21) does not address when the form has to be submitted. Usually it is 5 days after bid opening on other state public projects.
- A. Forms A, B, C and D (pages 20 to 23) of the BID FORMS AND SUPPLEMENTS shall be submitted with the Bid, in accordance with page 27 of Section 00410 – BID FORMS AND SUPPLEMENTS. The two lowest Bidders must submit the DBE(s)' most recent certification letter(s) within three business days of the bid opening, in accordance with paragraph 1.24.C (page 7) of Section 00200 – INSTRUCTIONS TO BIDDERS.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

BIDDERS CHECKLIST FOR INFORMATION ONLY

MBTA Contract No. R20CN01 Title: WORK PLATFORMS FOR RIVERSIDE CARHOUSE

This checklist is provided to assist Bidders in determining that required signatures and submittals are included along with the Bid Proposal.

	ITEM	REFERENCE PAGE Section 00410	ACTION REQUIRED
1	Addenda acknowledged	3	Acknowledge all addenda issued
2	Letter of Commitment furnished from proposed surety	3	Attach letter
3	Certification pertaining to ineligible contractors completed	6	Bidder's authorized signature
4	Right-To-Know Law Certification	12	Bidder's authorized signature
5	Certification of Dumping Facilities completed	13	Data and Bidder's authorized signature
6	Bid signature(s) including EEO certification and DBE assurance	7	Bidder's authorized signature
7	Bidder's data including joint venture authorization	8 and 9	Furnish data
8	Required proposal guarantee (bid deposit furnished)	7	Attach amount as indicated
9	Affidavit of non-collusion Completed	10	Bidder's authorized signature (notarized)
10	Forms for participation by DBE Completed	20 through 23	Furnish information and authorized signatures
11	DBE's Affidavit and most recent certification	22	Completed Affidavit and attach DBE certification
12	Buy America Certificate Completed	11	Data and Bidder's authorized signature
13	Certification relating to Debarment, Suspension, Ineligibility, and Voluntary exclusion	14 through 17	Bidder's authorized signature
14	Certification of restrictions on lobbying	18	Bidder's authorized signature
15	Certification of Undocumented Workers	24	Bidder's authorized signature
16	Certification of Construction Equipment Standard Compliance	19	Bidder's authorized signature
17	M.G.L. Chapter 30, Section 39S – Certification of Work in Harmony and OSHA Training	25	Bidder's authorized signature
18	MBTA Retiree Participation Disclosure	26	Bidder's authorized signature

NOTE: Disadvantaged Business Enterprise (DBE) stated goal is **10%**.

Minority Manpower Utilization (MMU) percent is **15.3%**

NA = Not Applicable

Female Construction Workforce: **6.9%** per trade

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

MBTA CONTRACT NO. R20CN01

WORK PLATFORMS FOR RIVERSIDE CARHOUSE

NEWTON, MASSACHUSETTS

ADDENDUM NO. 5

The attention of bidders submitting bids for the above project is called to the following Addendum to the Construction Specifications.

The items set forth herein, whether of omission, addition or substitution are to be included in and form a part of the Bid submitted.

THE NUMBER OF THIS ADDENDUM (NO. 5) MUST BE ENTERED IN THE SPACE PROVIDED ON PAGE 00410-3 OF THE FORM FOR BID IN THE BID FORM.

August 31, 2015

By: Frank DePaola
Interim General Manager of the MBTA

ITEM NO. 1

SUBSTITUTE SECTION 01322 – CONSTRUCTION SCHEDULE (LUMP SUM):

Delete Section 01322 in its entirety, and replace with new Section 01322 included as pages 3 through 19 of this Addendum No. 5.

SECTION 01322 (LUMP SUM) CONSTRUCTION SCHEDULE

1.1 DESCRIPTION

- A. This Section specifies the general requirements and procedures for preparing and submitting Contract Schedules to the Authority for review and acceptance.
- B. Refer to Section 01151 regarding payment requirements associated with the schedule.
- C. Refer to Section 00700 Article 6.6, 6.7 and 6.8 for requirements associated with Delay, Suspension of Work and Extension of time.
- D. Refer to Section III Project Schedule of the Project Controls Manual

1.2 SCHEDULE GLOSSARY

- A. The following terms used in this Section or elsewhere in the Contract Documents shall have these meanings:
 - 1. Acceleration – Occurs when an owner (MBTA) directs a contractor to complete work earlier than the contract substantial completion date (or milestone) or earlier than substantial completion date as modified in accordance with an approved time extension.
 - 2. Activity – An element in the schedule highlighting or depicting a part of the Work and establishing the time and resources required for completing that part of the Work.
 - 3. Artificial Activity Durations – Inflated activity durations in the schedule consume float and influence the critical path.
 - 4. As-Built Schedule- A schedule showing all activities complete including Final Completion.
 - 5. As-Planned Schedule/Baseline Schedule - Construction Schedule Revision 0 (Rev. 0) Submittal returned by the Authority to the Contractor as “Accepted as Submitted” or “Accepted as Noted,” with or without comments or objections noted, showing the contractor’s plan to complete the Work within the Contract Time. As-Planned and Baseline may be used interchangeably and shall have the same meaning.
 - 6. Construction Schedule - Schedule which shows the Contractor’s approach to planning, scheduling, and execution of the Work. Includes the Revision 0 and monthly Progress Schedule Submittal(s).
 - 7. Contract Float - Number of Calendar Days between the Contractor’s anticipated date for early completion of all or part of the Work and the corresponding Contract Time or Contract Milestone(s). Contract Float is further defined as the amount of time any given activity or path of activities may be delayed before it will affect the Contract Time.

8. Cost Loaded Schedule – A CPM schedule which includes the accurate allocation of the cost of the Work to all schedule activities. Costs allocated to each Activity are to be proportional to the scope of the Work of the Activity and consistent with the bid items. The sum of the cost of all schedule Activities is equal to the total Contract Price.
9. CPM - The Critical Path Method of planning and scheduling. References to the Critical Path Method (CPM) shall be to CPM construction industry standards that are consistent with this Section 01322.
10. Critical Path - Any continuous sequence of Activities in the schedule that controls achievement of a corresponding Contract Time or Milestone(s).
11. Data Date- The data up to or through which the project's reporting system has provided actual status and accomplishment. A schedule with a data date of December 1, 2013 shall be referred to as the November 2013 schedule.
12. Days - Refer to Section 00700, Article 1 of the General Conditions.
13. Delays - Slippage of the dates in any Progress Schedule Submittal which forecast any slippage or overrun of Milestone(s) or Contract Times.
14. Disposition – The determined status of the construction schedule submittal after being reviewed by all reviewers for compliance with the Authority's schedule specification. Corrections and/or comments made as part of this submittal review do not relieve contractor of responsibility from conformance with the Contract Documents which has priority over this submittal. The disposition shall be one of the following:
 1. Accepted as Submitted
 2. Accepted with Comments
 3. Not Accepted
 4. For Information Only
 5. Revise and Resubmit
15. Draft Schedule – A working schedule with changes made to the As-Planned Schedule, which has not yet been accepted by the Authority.
16. Early Completion Schedule - A CPM schedule showing completion of the Work ahead of the Contract Time specified in Section 00700, Article 6.2, Prosecution of Work.
17. Early and Late Dates - Early times and late times of performance for the Activities as defined by CPM techniques and as further limited by the requirements of the General Conditions.
18. Fragnet – A fragnet is defined as a sequence of new activities and for activity revisions that are proposed to be added to the existing schedule to demonstrate schedule impact and the method for incorporating changes into the schedule as they are encountered.
19. Milestone - A key event (zero duration) established in the Construction Schedule and as specified in the Contract Documents under Section 00700, Article 6.2.
20. Notice to Proceed (NTP) - The date when the Contract commences.

21. Out of Sequence – When an activity starts or finishes before its predecessor.
22. Preferential Sequencing - Activities that can be performed concurrently and are established in the project schedule as sequential for the purpose of consuming float.
23. Resource Loaded Schedule - A CPM schedule which includes the accurate allocation of the resources to perform the Work, for all schedule activities. Resources allocated to each Activity are to be proportional to the scope of the Work of the Activity.
24. Schedule Meeting - Meeting to review the progress on the Schedule including but not limited to the actual percentage of completion, the actual quantity of resources and number of personnel used, comparing actual dates with the early dates; and the resources/personnel intended to be used for the Look-Ahead Schedule and Recovery Plans as necessary.
25. Schedule Narrative – A descriptive report submitted with each schedule. The required contents of this report are set forth in this scheduling specification, Section 1.8.
26. Schedule Recovery – A schedule that forecasts substantial completion by either the original completion date, or some other date that is earlier than the current projected completion date reflected in the most recent update.
27. Time Impact Analysis (TIA) – Process of quantifying and apportioning the effect of delay or change on a project schedule.
28. Work Day - Any day contract Work is to be performed.

- B.** Other terms used in this Section shall have the meanings assigned to them elsewhere in the Contract Documents, and if not assigned and where the context will permit, as used or defined in Massachusetts General Laws (M.G.L.).

1.3

SCHEDULER REQUIREMENTS

- A.** The name of the Project Scheduler, together with his/her qualifications, shall be submitted to the Authority for approval. The Project Scheduler shall have a minimum of five [5] years of project CPM scheduling experience, three [3] years of which shall be on projects of similar scope and value of this project. This person shall develop and maintain all aspects of Work on all requirements in this Section as well as all others that relate to planning, scheduling, coordination and reporting of the project status.

1.4

CONSTRUCTION SCHEDULE REQUIREMENTS

- A.** The Contractor's approach to prosecution of the Work shall be disclosed to the Authority by submission of the computerized **cost and resource loaded** construction schedule required in this Section. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.
- B.** The Contractor is advised that its schedules and reports, as specified herein, will be an integral part of the Authority's management program. The Contractor's schedules will be used by the Authority to monitor project progress, plan the level-of-effort by its own Work forces and consultants, and as a critical decision making tool. Accordingly, the Contractor shall ensure

that it complies fully with the requirements specified herein and that its schedules are both timely and accurate throughout the life of the project. The utilization of secondary schedules (those other than the Baseline Schedule or Progress Schedule Submittals) is prohibited. The Contractor's schedules shall be used by the Authority and Contractor for the following purposes as well as any other purpose where the issue of time is relevant, the Contractor must prepare and plan the CPM with the following considerations:

1. Communicate to the Authority the Contractor's current plan for performing and completing the Work;
 2. Identify scope and paths that are critical to the timely completion of the Work;
 3. Identify upcoming activities on the critical path(s);
 4. Evaluate the best course of action for recovering schedule delays;
 5. Basis of progress payments to the Contractor;
 6. Basis for analyzing the time impact of changes in the Work;
 7. Identify when submittals will be made by the Contractor for the Authority's review;
 8. Aid in prioritizing the Authority's review of submittals;
 9. Document the actual progress of the Work;
 10. Evaluate resource requirements of the Contractor and the Authority;
 11. Aid in integrating the Work with the operational requirements of the Authority;
 12. Facilitate efforts to complete the Work in a timely manner;
 13. Assign responsibility for performing specific activities;
 14. Identify access and availability of Work areas;
 15. Identify interfaces and dependencies with preceding, concurrent, and follow-on contractors; and
 16. Identify lookahead activities.
- C. The construction schedule shall clearly define the prosecution of the Work from Notice to Proceed to final completion by using CPM activities for, but not limited to: submittal preparation, reviews, resubmissions and approval, Milestones, Authority furnished items, material and equipment, interfaces with other contractors, Public Utilities, permitting, testing, deliveries, construction activities, Final Inspection, Certificate of Occupancy, required inspections by Authorities Having Jurisdiction (AHJ), Punch list, substantial completion, final completion, Authority training, and move-in CPM Activities. Logic ties shall be realistic to show the Contractor's Work sequencing and separately define all requisite Authority tasks.
- D. The Contractor has the responsibility to incorporate the Subcontractors and Suppliers input into the schedule for activities, logic ties, etc. involving their Work.
- E. Acceptance of the construction schedule by the Authority shall not relieve the Contractor from compliance with the requirements of the Contract Documents, or result in the approval of any variation from the Contract Documents.
- F. Oracle Primavera Scheduling Software shall be used for all schedules. One license is to be provided to the MBTA Project Office. The contractor may submit to MBTA Project Controls, for approval, a request to use alternative scheduling software compatible with .xer files. The schedule software shall run on Windows platform compatible equipment. The software must also have a demonstrated ability to compare multiple updates (equivalent to Claim Digger). The Contractor shall provide the Authority with certified software training, pay all costs associated with maintenance fees and furnish to the Authority all upgrades and updates acquired from the software vendor during the period allowed for completion of the Work.

- G. The Contractor will submit as part of the Rev. 0 and monthly Progress Schedule Submittal(s) an electronic .xer file containing the complete construction schedule data and files in compliance with the requirements of this Section. Submit electronic files to correspond to the scheduling software mentioned or approved above. Provide the appropriate amount of schedule submittals to the project and one copy to:

MBTA Project Controls
100 Summer Street, Suite 1200
Boston, MA 02110
617-222-5910
projectcontrols@mbta.com

- H. Contractor agrees to:

1. Present to the Authority its scheduling or execution of the Work.
2. Will not utilize schedules different from those submitted to the Authority or any Subcontractor for performance or coordination of the Work.
3. Submit schedules that accurately reflect the intent or reasonable expectations of the Contractor and its Subcontractors.

- I. The Contractor is required to provide a Cost and Resource Loaded Schedule.

1. These project controls tools are to include the accurate allocation of the costs and resources to complete the Work for all schedule activities. Costs allocated to each Activity are to be proportional to the scope of the Work of the activity and consistent with the Contractor's detailed bid. The contractor shall provide written quotes from subs, vendors, suppliers to the Authority upon request. The Authority reserves the right to use the cost-loading as a means to resolve changes and/or claims. Front-loading or other unbalancing of the cost distribution will not be permitted. The sum of the cost of all schedule activities is equal to the total Contract Price. If the cost distribution appears to be unbalanced, the Authority will require written justification as described above prior to accepting the baseline schedule.
2. A CPM schedule includes the accurate allocation of the resources to perform the Work, for all schedule activities. Resources allocated to each Activity are to be proportional to the scope of the Work of the Activity and consistent with the Contractor's detailed bid. The Authority reserves the right to use the Resource Loading as a means to resolve changes and/or claims. Indicating the man-hours per day, by trade and crew, and equipment hour/day is required. The Contractor shall resource load all Schedules to demonstrate the Contractors anticipated crew sizes and that the Contractor's production-based assessments adequately serve as a reasonable plan for the overall Time requirements of the Contract. Durations shall be based on the planned production rates, based on the labor crews, equipment, crew sizes, and materials required to perform each activity. In addition, all change orders will be required to be resource loaded to validate and monitor the duration of the Work to be performed.

- J. Default progress data is not allowed. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software systems.

Actual start and finish dates and remaining duration on the CPM schedule shall match those dates provided from the Contractor back up paperwork (i.e. daily reports, delivery slips, etc.).

- K. The contractor shall only utilize "Retain Logic" (schedule calculation).
- L. The contractor shall not artificially improve its progress by revising schedule logic, relationships, or shortening planned activity durations.
- M. Proposed changes to the As-Planned Schedule/Baseline Schedule, initiated by the Contractor, shall be presented to the Authority as a Draft Schedule for review (see Section 1.11B).
- N. Contractor's failure to substantially comply with this Section shall be a substantial and material breach of contract. In the event the Contractor fails, refuses or neglects to comply with the requirements of this Section 01322, the Authority may elect any of the following: (a) nullify any mobilization payments previously made, (b) stop payments under the monthly partial payment request, (c) prepare alternate progress schedules, as may be suitable under the circumstances, and deduct from the Contract Price all related costs by Change Order, (d) entitle the Authority to the damages afforded for misrepresentation or fraud by these Contract Documents or applicable law. Continued failure of the Contractor to perform in accordance with the requirements of this Section 01322 will be reason to place the Contractor in default of his obligation there under and terminate the Contract.

1.5 USE OF FLOAT

- A. Contract Float is not for the exclusive use or benefit of either the Authority or the Contractor, but must be used in the best interest of completing the project within the Contract Time. If the dates in any Progress Schedule Submittal forecast any slippage or overrun of the Contract Times, the Contractor shall indicate such slippage or overrun by reporting negative Contract Float.
- B. Sequestering of float shall be cause for non-acceptance of the contractor's schedule submittal. In the event that float sequestering is identified, the schedule shall be revised appropriately. The Contractor shall not utilize the following:
 - 1. Float suppression techniques in the Construction Schedule, including but not limited to interim dates imposed by the Contractor other than Contract Time(s) and Contract Milestone(s);
 - 2. Inclusion of activities or constraints in a path or chain leading to a Contract Milestone which are unrelated to the Work as stated and specified in the Contract Documents;
 - 3. Activity durations or sequences deemed by the Authority to be unreasonable in whole or in part;
 - 4. Preferential Sequencing;
 - 5. Artificial Activity Durations; and
 - 6. Misrepresentation of work hours specified in project calendars.
- C. All Contract Time(s) and Milestones shall be imposed, coded and separately identified in all Progress Schedule Submittals in conformance with the Milestone(s) and Contract Time(s) set forth in the Contract Documents. The Contractor shall impose no other date constraints in the construction schedule, unless an explanation of their basis is provided and is acceptable to the Authority.

- D. If the Contractor is delayed in performing the Work, the Contractor shall absorb any related delay, disruption, interference, hindrance, extension or acceleration, however caused, until all Contract Float is consumed. The Contractor shall Work cooperatively with the Authority, adjacent contractors, and third parties, to identify and implement to the maximum extent possible, no-cost measures to recover all schedule delays, regardless of the cause of the delays. One example of such measures is no-cost re-sequencing of Work activities.
- E. Extensions of time for performance of the Work required under the General Conditions pertaining to equitable time adjustment will only be considered to the extent that the equitable time adjustment for activities affected by any condition or event which entitles the Contractor to a time extension, exceed the Contract Float.

1.6 ACTIVITY REQUIREMENTS

- A. Activity durations shall equate to the Work Days required to complete the Work included in each Activity.
1. Activity Durations greater than thirty (30) calendar days should be kept to a minimum, and must be approved by the Authority, except in the case of non-construction activities such as mobilization, procurement of materials, and delivery of equipment. Submittal review activities shall be thirty (30) Calendar Days, unless different review times are specified in other sections of the Contract Documents.
- B. In general, Activities shall be detailed in a manner that utilizes planned durations from one (1) day to thirty (30) Calendar Days, and have a value not exceeding \$50,000. No costs shall be applied to "prepare and submit" and "review and approve" submittal activities. The Authority recognizes that the cost for the early submittal preparation Work is included in the cost of mobilization and shall be billed under that payment item accordingly.
- C. Activities shall be assigned consistent descriptions, identification codes and sort codes. Sort code organization shall: (a) be subject to the Authority's prior consent; (b) group Activities using meaningful organizations defined by Contractor and the Authority; and (c) designate lead responsibility for each Activity. The Contractor shall include specific schedule activity identification codes in its daily field reports when describing the items of Work performed each day.
- D. The total Contract Price shall be allocated to the CPM activities. The cost loaded schedule shall be directly related to the Bid Form and activities defined in the As-Planned schedule. When the schedule is grouped by "Bid item" code, the summary value should be equal to each item in the contract bid form (See Section 1.4 I).
- E. The Work Breakdown Structure shown below shall be utilized to the fullest extent possible.

-Project

-Milestones

-Procurement

-Prepare & Submit

-Review & Approve

-Fabrication

-Construction

-Phase/Location/Area

-Preconstruction

-Construction Activities

-Inspections/Certification

-Closeout

- F. Activities shall be sufficiently detailed to separate items of Unit Price Work from lump sum Work, breakout distinct classes of Work (e.g. CSI Divisions/Sections or equivalent) and Work in separate areas or locations, as specified by the Authority. Work being performed by DBE firms shall be identified as separate CPM activities.
- G. Activity Code – The Schedule shall include but not be limited to the following activity codes:
1. Bid item
 2. Submittal
 3. Review/approval
 4. Procurement/fabrication
 5. Delivery
 6. Construction/installation
 7. Change order
 8. Milestone
 9. Responsibility
 10. Areas
 11. Construction phase
- All notices of non-conformance shall be included as a separate activity code
- H. Activities shall be broken down to a sufficient level of detail to avoid the use of lag. The Contractor shall seek approval and provide justification for the use of logic 'lags.' 'Negative lags' are not allowed.

1.7 SCHEDULES/REPORTS/PLOTS

- A. Activity Reports shall include Activity ID, description, duration, calendar, Early Dates, Actual Dates, and Late Dates, Total Float and sort codes as specified by the Authority. The Late Finish Date of any Activity representing a Milestone shall equal the corresponding Contract Time. In addition, Activity reports shall show, for each Activity, all preceding and succeeding driving logic ties or attach a separate report combining such Activity and logic tie data.
- B. Bid Item Report shall include Activity ID, description, duration, early dates, total float, budgeted cost, physical % completed and actual cost this period. The Contractor shall follow the Authority's Sample Bid Item Report and Procedures document. A copy may be requested by contractors through MBTA Project Controls. (See "Construction Schedule/Pay Requisition Approval Process Flowchart", Exhibit D in the MBTA Project Controls Manual 10.16.14 Rev. 4).
- C. Resource Report shall include monthly and cumulative crew hour performance curves for its own forces and subcontractors, as designated by the Authority with all schedule submissions. These performance curves shall be based on current Early Dates and Late Dates and, when requested by the Authority, shall compare As-Planned Early Dates and current Early Dates. The Contractor shall also resource load its planned equipment for all activities.

The Contractor shall prepare a crew hour analysis in the form of a series of graphic displays depicting manpower by principal trades in the aggregate, and in accordance with the schedule. The graphs shall display the number of crew-days of effort, for each month, over the life of the

project. This submission shall be computerized and shall correlate with the labor data, exported from the Scheduling software and shall be submitted with the baseline and change orders.

- D. Cash Flow Report shall be developed using the cost assigned to each activity of the Schedule and a monthly cash flow projection, illustrated by exporting the scheduling data in graphic display or tabular form. Both shall demonstrate the estimated cash drawdown in the aggregate, by month, over the life of the project. Additionally, the data shall be organized/sortable by Activity. Redistribution of budgeted costs is prohibited after the complete Rev. 0 baseline has been returned "accepted or accepted as noted".
- E. Look-Ahead Report shall display the activities planned at the closing (i.e. data, cut-off) date that cover the previous two (2) weeks and the next four (4) weeks. The utilization of look-ahead or look-back schedules that do not directly utilize the same activity coding within the baseline schedule and subsequent progress schedules, is prohibited. The Look Ahead Report shall be submitted for each progress meeting.

If any of the required schedule submissions, in this Section, are returned to the Contractor for corrections or revisions, they shall be resubmitted, along with an electronic file, for acceptance within ten (10) calendar days after the return.

1.8 NARRATIVES

The Schedule Narrative is a component of the schedule submittal. Each narrative shall list the Activities on each Critical Path and compare Early Dates and Late Dates for Activities designating Contract Times.

The Schedule Narrative shall communicate to the Authority the Contractor's progress and plan for performing and completing the Work.

A. Baseline narrative shall include details regarding:

1. The use of construction equipment and resources
2. Basis and assumptions for activity durations and logic
3. Compliance with winter weather requirements and adverse weather
4. Any shifts non-Work days and multiple calendars applied to the activities
5. Financial periods as related to progress and payments
6. Identify activity Work items and paths that are critical to the timely completion of the Work
7. Critical submittals by the Contractor for the Authority's review
8. Plan and approach to sequencing of the Work
9. All labor and equipment resources shall be defined according to each crew by trade
10. Glossary of Terms, Schedule Coding, and Abbreviations used in the Contract Schedule.
11. Calendar
12. Budgeted Cost

B. Progress Schedule Submittal Narrative shall include details regarding:

1. Identify activity Work items and paths that are critical to the timely completion of the Work
2. Explanation of Work that couldn't be performed in the previous period
3. Critical submittals by the Contractor for the Authority's review

4. Any potential/future/pending changes in access to or availability of Work areas
5. Upcoming phased or total takeover by Authority. Overview of progress and changes since the last submittal and discussion of potential and actual delays
6. Changes in activities
7. Calendar
8. Logic
9. Cost this period
10. Remaining cost
11. Cost to date

C. TIA/Recovery Narrative shall include details regarding:

1. Proposed course of action for recovering any schedule delays
2. Any significant change to resources for completed, current, and forecasted Work
3. Plan and approach to sequencing of the Work
4. Calendar
5. Logic
6. Recovery Plan
7. Contractor Initiated Revisions

D. Each narrative shall certify that the Contractor has not been delayed, as of the closing date, by any act, error or omission of the Authority, except as otherwise specifically stated in the narrative or identified in a claim submitted in accordance with the General Conditions of the Contract. If the Contractor fails to comply, then any determination made by the Authority will be binding on the Contractor.

1.9 ADVERSE WEATHER PLANNING

- A. The schedule submittal to the Authority must include planning for adverse weather if applicable. Planning for adverse weather is the strategy used to develop a schedule that produces reasonable and historically consistent early start dates. If applicable, it is reasonable to conclude that adverse weather conditions will be expected for a specific project in a specific location during a specific time frame.**
- B. The Contractor must provide the Authority evidence of excessive weather conditions from NOAA (National Oceanic Atmospheric Administration) in order to utilize the days allocated for adverse weather.**
- C. Weather events consist of rain in excess of 0.5"/day or snow of 0.5"/hr. occurring within the Work hours and affects specific weather sensitive activities that forces shut down of 50% or more of the project, the workday, or personnel. Weather sensitive activities shall be reflected within the schedule with the appropriate weather calendar assignment.**

- D. The Contractor's project schedule must reflect the following non-work days due to adverse weather.

NUMBER OF ANTICIPATED ADVERSE WEATHER DAYS PER MONTH

<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>
7	5	2	1	0	0
<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
0	0	1	1	1	3

- E. Time Extension for unusually severe weather:

1. This provision specifies the requirements for the consideration of time extensions for unusually severe weather. In order for the Authority to grant a time extension, the following conditions must be satisfied.
 - a. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month as discussed in 1.9.C.
 - b. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.
2. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall record on the daily activity logs, the occurrence of adverse weather and resultant impact to normally scheduled Work. Actual adverse weather delay days must prevent Work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph 1.9.D, the Authority will convert any qualifying delays to calendar days and issue a modification.
3. Determination will be based on the TIA section.

1.10 CONSTRUCTION BASELINE SCHEDULE SUBMITTAL

- A. The **Initial Schedule** (90 Day) Submittal shall be due within ten (10) Days after receipt of the Notice to Proceed, and shall include the Contractor's detailed plan, with all schedule requirements contained in this Section with at least the first three (3) months of the forthcoming complete baseline. This schedule shall be cost and resource loaded and shall identify activities to be completed and associated budgeted amounts for the first three (3) months.
- B. The **Baseline** Schedule (fully cost and resource loaded) shall be due within 45 days from NTP.

The Baseline Schedule shall reflect the Work as awarded and shall purposely exclude any Delays, Change Orders, "or equal" materials, equipment and substitutions of any kind. Additionally, the Contractor is to ensure that the schedule submission is in complete conformance with the intent of the Contract Documents. No proposed alternates will be accepted until presented to the Authority after the full Baseline Schedule has been accepted. After acceptance of the Baseline Schedule, redistribution of costs is prohibited.

- C. Each Schedule Submittal shall include an electronic file with the Contractor's schedule data files (including activity data, logic, coding, resource and cost data), a narrative and four (4) copies of the specified Activity Reports, Bid Item Report, Cash Flow Plots, Resource Plots, Look Ahead Schedule as defined in paragraph 1.7, all in formats, sorts and sequences acceptable to the Authority.
- D. The first partial payment shall not be made until the Authority returns to the Contractor the **Initial Schedule (90 Day)** as "Accepted as Submitted" or "Accepted as Noted". The first partial payment is limited to costs associated with mobilization, third party utility, insurance and bond. Payment associated with mobilization shall be limited to 2% of the total contract value less the value of allowance items. Half of the mobilization schedule activity cost (1%) is applied to the first partial payment.

The second partial payment shall be limited to pro-rated CPM schedule costs and the remaining half of mobilization (1%), and shall be made after the **Baseline Schedule** is returned "Accepted as Submitted" or "Accepted as Noted."
- E. Once the Baseline Schedule is returned to the Contractor as "Accepted as Submitted" or "Accepted as Noted", it shall become the *As-Planned* Schedule of record. Once established, the *As-Planned* Schedule shall be used as the basis for Monthly Schedule Submittals.
- F. The Construction Baseline Schedule shall incorporate the Contractor's best estimate of the Activities and logic ties required to perform the Work within the limits of the Contract Times.
- G. The Contractor shall uniquely identify the Baseline Schedule Submittal by using the filename nomenclature, as shown in the Project Controls Manual Exhibit E.

1.11 MONTHLY PROGRESS SCHEDULE

The Monthly Progress Schedule shall be reviewed by the Authority to determine disposition.

The Contractor shall uniquely identify the Monthly Progress Schedule Submittal by using the filename nomenclature, as shown in the Project Controls Manual Exhibit E.

A. PROGRESS SCHEDULE SUBMITTAL

1. The Progress Schedule is limited to the following:
 - a. Actual start dates;
 - b. Remaining duration values;
 - c. Actual completion dates;
 - d. Actual cost this period;
 - e. Activity physical percent completion value; and
 - f. Out of Sequence for current updated period.

2. Monthly Progress schedules are required as a prerequisite to processing each partial payment starting with the third and subsequent payment requisitions. The schedule shall be limited to progress up to the closing date of each month.
3. The Authority and Contractor shall utilize the accepted Progress Schedule to monitor progress against the baseline.
4. In the event issues, changes, or re-sequencing of work is required, the Contractor shall prepare a draft schedule as described in Section 1.11 B.
5. If the Contractor fails to fully resolve all the Authority's review comments and objects to the satisfaction of the Authority within sixty (60) calendar days from the date of the disposition, the Authority shall withhold further progress payments.
6. The Bid Item Report is required to be submitted with a Progress Schedule Submittal.
7. Disposition for the progress schedules as defined by the Authority is one of the following:
 - a. Accepted as Submitted
 - b. Accepted with Comments
 - c. Not Accepted
 - d. For Information Only
 - e. Revise and Resubmit

B. DRAFT SCHEDULE SUBMITTAL

1. All changes that occurred from the previously accepted Monthly Progress Schedule, and not currently submitted to the Authority for acceptance shall be recorded only on the Draft Schedule submittal.
2. The Draft Schedule submittal shall incorporate all proposed activity and logic revisions required to accomplish the following:
 - a. Implement changes in the Work;
 - b. Detail all impacts on pre-existing Activities;
 - c. Show Recovery Schedule;
 - d. Reflect the Contractor's proposed approach for remaining Work;
 - e. Incorporate substitution proposals; and
 - f. Potential Change Orders, RFI's and Non-conformance.
3. Other types of changes to the Project Schedule may include, but not limited to the following:
 - a. Added/Deleted activities;
 - b. Original Duration changes;
 - c. Change Order values;
 - d. Assigned resources; and
 - e. Assigned calendars.
4. The Contractor shall submit a Draft Schedule and Narrative to the Authority and the Consultant in order to review the proposed changes to the remaining work. The Authority will schedule a workshop to discuss at a minimum: the impacts, recovery plan, change order schedules (fragnets), plan vs. current performance, manpower, etc. The required attendance for the Draft Schedule Workshop is as follows:

- a. Project managers (Authority and Contractor);
 - b. Resident Engineer (Authority);
 - c. Schedulers (Consultant, Authority, and Contractor);
 - d. Owner's Representative, if applicable; and
 - e. Key Subcontractors, as determined by the Authority.
5. The review of the Draft Schedule Submittal by the Authority does not assess ownership of delays. A separate Time Impact Analysis (TIA) shall be submitted as specified in Section 1.11 D to identify ownership of delays.
 6. The accepted Draft Schedule Submittal shall become the new As-Planned Schedule for future monthly progress schedule.

C. SCHEDULE RECOVERY

Should the progress fall behind the contractual milestones for reasons other than those that are excusable within the terms of the contract, the Contractor shall implement a plan to recover the schedule. The plan must detail how impact will be mitigated through the use of activity re-sequencing, adding additional crews, longer work hours, extra work days, etc., at no cost to the Authority.

D. TIME IMPACT ANALYSIS SUBMITTAL

Any Contractor request for adjustment in Contract Time and Contract Price will not be evaluated unless (a) the Contractor, using the procedures in this Section and the Contract, shows that conditions justifying adjustments in Contract Time and/or Contract Price have arisen, and (b) the Contractor's analysis is verifiable through an independent review of the Time Impact Analysis (TIA) by the Authority.

Determination and extension of the Contract Time will be in accordance with Section 00700 Article 6.8. In order for the impact to be considered, the Contractor shall demonstrate that the critical path was adversely affected.

1. The Contractor shall submit to the Authority a TIA illustrating the influence of each change or impact to the current contractual Milestones.
2. Each TIA shall include a 'fragnet' demonstrating how the change issue or event impacts the last accepted Progress Schedule Update and critical path. This fragnet shall be resource loaded.
3. A meeting between the contractor, Authority project staff, and MBTA Project Controls shall be held to thoroughly review, analyze, and resolve each alleged impact.
4. The TIA shall include:
 - a. A detailed narrative which clearly describes the events causing the impact;
 - b. Documentation substantiating and supporting the impact;
 - c. Detailed CPM Schedules (both electronic and hard copies) clearly delineating the impact to the critical path;
 - d. A matrix showing impacts caused by any third party and any force majeure; and

- e. Any additional information reasonably requested by the Authority that is needed to perform the review of the Contractor submitted TIA.
- 5. The extension of Contract Time shall be considered only if the Contractor is able to demonstrate merit of the impact to the critical path using Window Analysis Methodology (as defined in AACE Recommended Practices #29R-03, Forensic Schedule Analysis), or other similar methodology acceptable to the Authority.
- 6. The Contractor's failure, refusal or neglect to comply with the requirements specified in this Section shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence. If faced with such a situation, the Authority may:
 - a. Direct alternate schedule recovery - if in the judgment of the Authority it appears that the Contractor cannot complete his Work within the scheduled time, then the Contractor shall Work overtime, additional shifts or adopt such other procedures as may be necessary to restore adherence to the schedule. The full cost of any such recovery - Work efforts shall be borne by the Contractor, and/or
 - b. The Authority can withhold liquidated damages, as provided in Section 00700 Article 6.9.

E. SCHEDULE ACCELERATION

Acceleration occurs when an owner (MBTA) directs a contractor to complete work earlier than a contractual milestone date or as modified in accordance with an approved time extension (See Section 1.11 D). The Contractor shall adhere to the following procedure.

Ten (10) business days prior to negotiations with the Authority, the Contractor shall provide a schedule for acceleration of remaining work and all supporting documents including, but not limited to the following:

- a. Identify activities to be accelerated
- b. Identify proposed calendar(s)
- c. Identify proposed crew(s)
- d. Identify proposed duration changes
- e. Identify proposed logic changes
- f. Provide narrative with basis of assumption
- g. Identify cost for acceleration

G. MEETINGS

- 1. Schedule Planning Session - Within fifteen (15) days after Contract award, and prior to submission of the baseline construction schedule, the Contractor shall attend a schedule planning session. At the meeting the Authority shall discuss procedures associated with schedule and costs as described in the Project Controls Manual, Exhibit A, Contractor Schedule Submittal Review Workflow; Exhibit B, Schedule Planning Session; Exhibit C, Uniform Schedule (P6) Settings for MBTA Projects; Exhibit D, Construction Schedules/Pay Requisition Approval Process Flow Chart; and Exhibit E, Filename Nomenclature. This session will also be attended by the Authority and its consultants. The Contractor shall anticipate requiring the attendance of key members of the Contractor's project team including the Contractor's scheduler. During this session, the Contractor shall present its planned approach to the project:

- a. The planned construction sequence and phasing; identify Work self-performed and sub-contracted;
- b. A listing of all key submittals with an initial priority rating for each of them;
- c. Estimated durations of major work activities;
- d. The anticipated critical path of the project; and
- e. A summary of the most difficult schedule challenges the Contractor is anticipating and how it plans to manage and control those challenges.

This will be an interactive session, and the Contractor shall answer all questions that the Authority and its Consultants may have. The Engineer shall provide copies of a written summary of the information presented and discussed during the session to the attendees. The Contractor's initial Construction Schedule Revision 0 and accompanying Schedule Narrative shall incorporate the information discussed at this schedule planning session.

- 2. Schedule/Pay Requisition Meeting – A meeting will be required and held monthly by the contractor, the consultant, and MBTA Field Staff to discuss and agree on monthly schedule progress. The Contractor shall anticipate that key members of the Contractor staff including but not limited to the Project Manager, the Site Supervisor, the Construction Scheduler and a representative of the key sub-contractors (as determined by the Engineer), shall attend each of these meetings. This meeting is to be separate from the Job Progress Meeting, and separate from the Work-Off List Meeting.
- 3. Work-Off Meeting (and Work-Off List) – A series of meetings in which representatives from the Authority, the Contractor (consisting of no less than the Project Manager, the Site Supervisor, the Office Engineer, and the Construction Scheduler), every key sub contractor (as determined by the Authority), and the Authority's Designer of Record are present to review the specific details of the Work that remains to be completed, the interdependencies within each area and crew, the remaining approvals and inspections, the requirements to obtain certificate of occupancy, and the detailed status of each Work activity and sub-Work activity. The Contractor is responsible to prepare and maintain the Work-off list consisting of detailed schedule activity data, with the same activity coding that is in the Baseline Schedule and the subsequent Progress Schedule updates. Meetings shall be held at the following intervals:
 - a. 4 to 2 months prior to station opening and/or project substantial completion – Work-off meetings will occur once a week;
 - b. 2 to 1 month prior to the station opening and/or project substantial completion – 2 times per week;
 - c. 1 month prior to the station opening and/or project substantial completion – 3 times per week.
 - d. Work-off Meetings are required when projects are four (4) months from a major Milestone, opening or Substantial Completion.

1.12 MEASUREMENT AND PAYMENT

A. MEASUREMENT

1. Separate Measurement will not be made for the Work of this Section complete in place, but all costs, therefore, shall be included in the Contract Lump Sum Price for the Work as indicated herein. All preparation and incidental Work necessary to accomplish the installation will be considered incidental to the Lump Sum price.

B. PAYMENT

1. Fifteen percent (15%) of the cost associated with the CPM Scheduling Activity will be made upon return to the Contractor of the complete cost and resource loaded CPM Construction Schedule Rev.0 Submittal as "Resubmittal Not Required" (As-Planned Schedule). This shall be included in the Contract's Lump Sum breakdown as an Activity within the CPM schedule.
2. The remaining (85%) will be pro-rated in equal amounts on each subsequent application for payment upon the Authority's receipt and approval of the monthly CPM updates. The number of months to be used for the pro-rating will be the number of months estimated to complete the Work as defined under Article 6.2 – Prosecution of Work. The final month pro-rated amount will not be made until the final application of payment.
3. All payments are subject to retainage.
4. The final payment may be released to the Contractor when the As-Built is submitted to the Authority for review and receives a disposition of "Accepted As Submitted".

C. PAYMENT ITEM

Item No.	Description	Unit
0130.174	MAINTENANCE FACILITY	LS

END OF SECTION

